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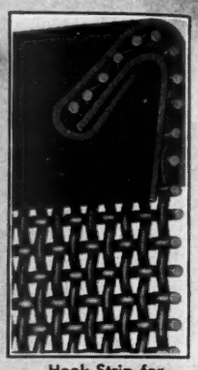
HIT AND QUARRY

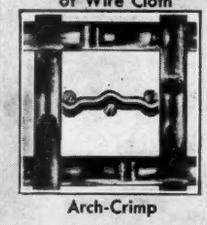
JUNE, 1946

FOR 29 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

LUDLOW-SAYLOR

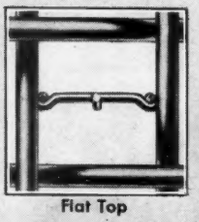


Hook Strip for Coarser Grades of Wire Cloth



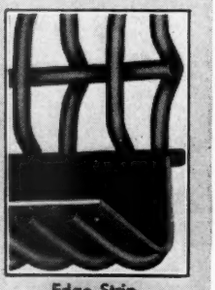
Arch-Crimp

Double-Crimp



Flat Top

Intermediate-Crimp



Edge Strip

NINETY YEARS of precision engineering, of striving for perfection, lie behind the rugged construction and accurately sized openings of Ludlow-Saylor wire screens. The same careful research has developed Super-Loy — the abrasion resistant, durable steel alloy, of which they are made.

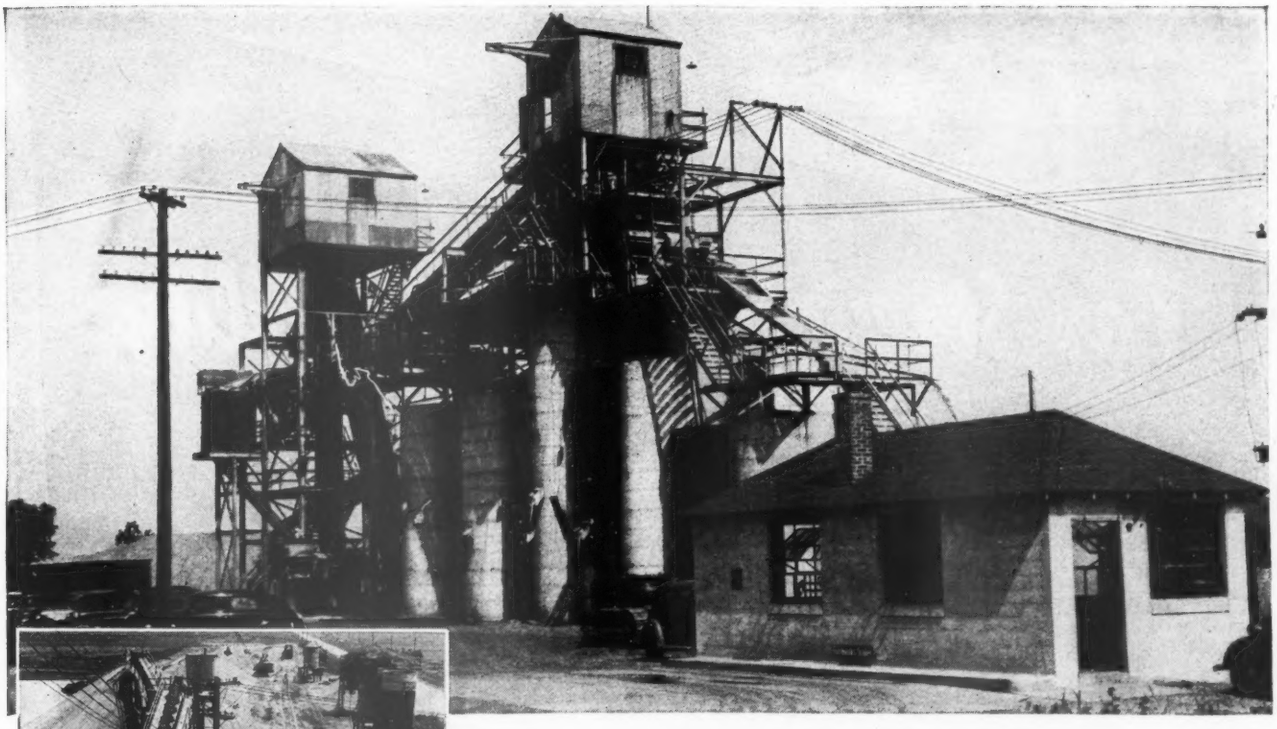
Whether engineered to meet your specific requirements, or selected from our wide variety of standard sizes and weaves, these wire cloths and wire screens give the maximum effective performance obtainable—and permit the maximum in efficient and economical operation.

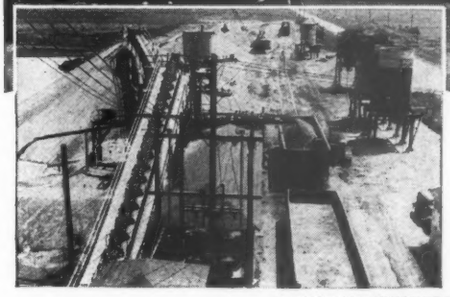
Our Bent Edges, Edge Strips, and Hook Strips are accurately built to fit your equipment.

Our 90TH Anniversary 1856-1946

The LUDLOW-SAYLOR WIRE COMPANY

622 South Newstead Ave. • ST. LOUIS 10, MISSOURI

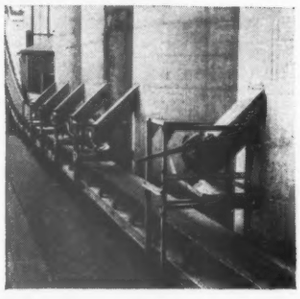




A SAND & GRAVEL PLANT

with operating flexibility to meet all specifications

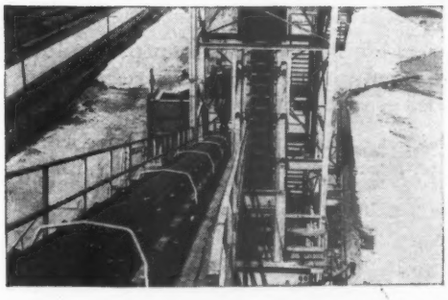
The two illustrations above show the complete plant, and a bird's-eye view of loading and stocking conveyors. At right: belt conveyor handling sized products from silos, to stocking or loading conveyors.



With plant details executed by Link-Belt Company, and featuring Link-Belt belt conveyors, the plant of The Rock Island Sand & Gravel Company was designed both to take care of existing specifications and future changes and expansion. The capacity is 1,500 tons in 8 hours.

Other Link-Belt equipment includes a 66-foot dredging elevator, with perforated dewatering buckets, for supplying the plant with material from the dredge sump; and a 15-foot diameter Rotoscoop, for making concrete sand. The plant also produces masons' sand and other special products.

Link-Belt can give you not only the economy and effectiveness of standardized equipment such as conveyors, elevators, Rotoscoops, Shaw Classifiers, screens, etc., but also a wealth of experience in designing complete sand-gravel plants. Let us give you further information.

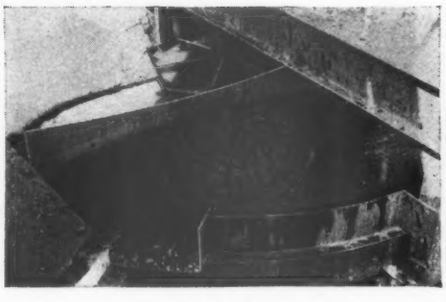


At left: View of conveyor handling gravel from screen.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8.
Offices in Principal Cities. 10,290

Right: the ROTO-SCOOP, an efficient, compact, self-contained dewatering unit for all types of sand.

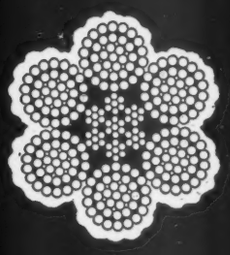


LINK-BELT

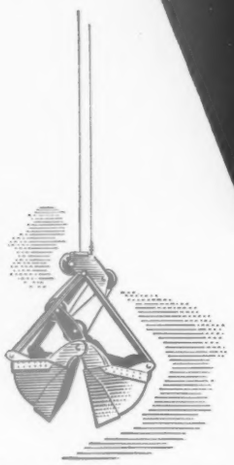
SAND AND GRAVEL HANDLING AND PREPARATION EQUIPMENT

PIT AND QUARRY, June, 1946. Vol. 33, No. 12. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copy 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879.

For Strength plus Flexibility



UPSON-WALTON
6x37 LAYRITE WIRE ROPE



FOR overhead traveling cranes in steel mills, for winch lines and slings, for holding and closing lines on grab buckets, for towing hawsers and mining machine ropes—industry after industry has conditions where high strength must be combined with great flexibility.

Wherever drum or sheave diameters are small, or where reverse or acute bends are encountered, fatigue stresses are high. For this type of service Upson-Walton 6 x 37 Perfection Layrite Cable is best because the individual wires in the strand are finer; therefore they are more flexible and better able to resist fatigue stresses. In addition, the greater number of fine wires in the rope gives it a greater metallic area, so strength is still high.

Hemp center or, where crushing conditions are extremely severe, IWRC (independent wire rope center).

Specify Upson-Walton 6 x 37 when you need maximum flexibility plus a high degree of strength.

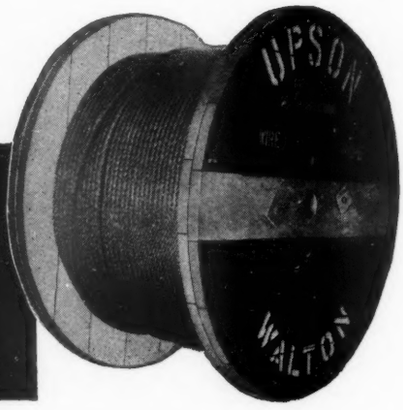
Specify Perfection grade because this improved plow steel is the strongest and toughest and most resistant to wear of all the grades of wire used to make rope.

Specify Layrite because this fine *pre*formed wire rope results in longer life, greater safety and greater economy.

Upson-Walton 6 x 37 Perfection Layrite is worth specifying, and always up to specifications!

Established 1871

Copyright 1946—The Upson-Walton Company



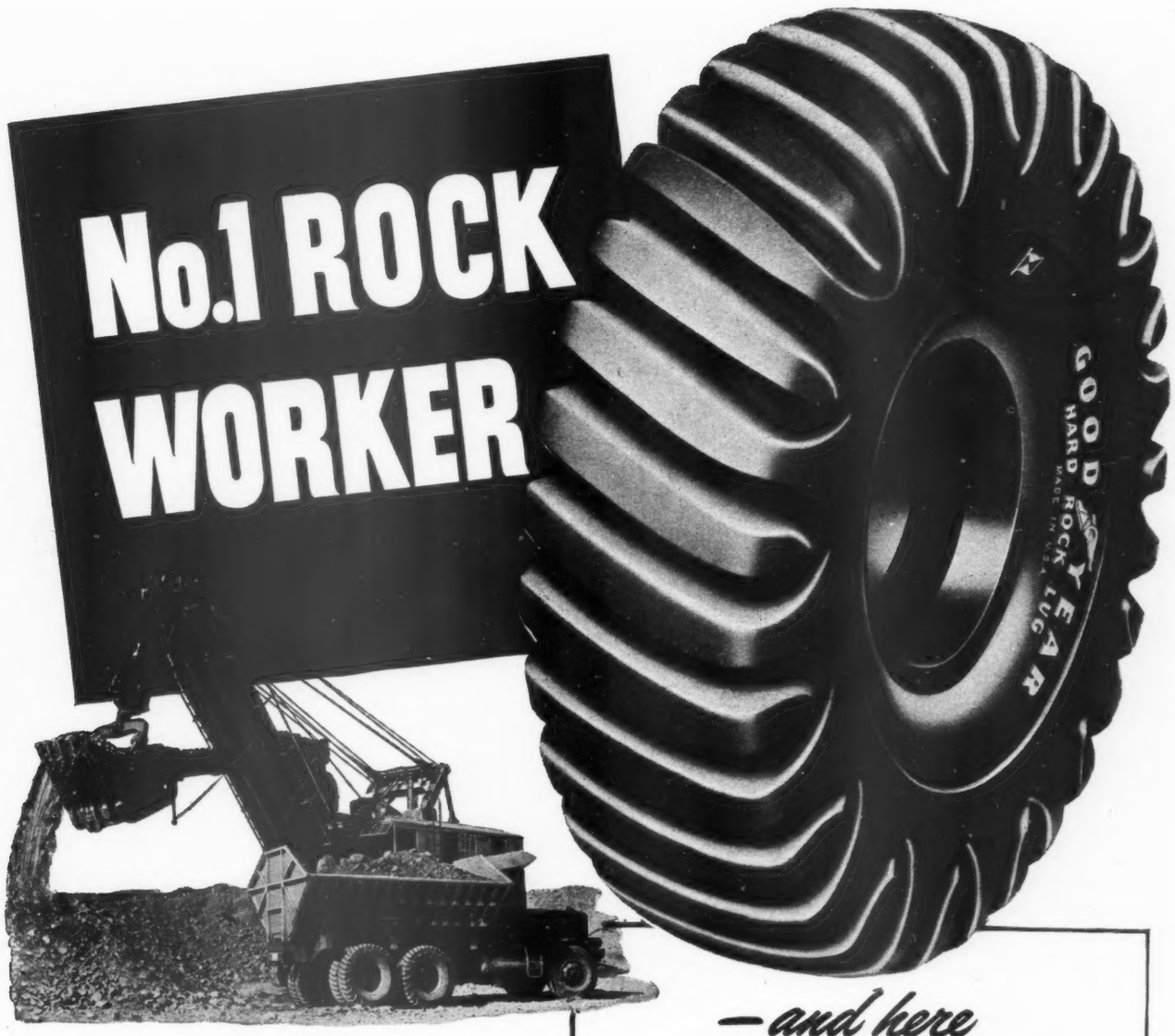
THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 — 737 W. Van Buren Street, Chicago 7 — 241 Oliver Building, Pittsburgh 22

No.1 ROCK WORKER



WHERE the going is tough — where tires must stand the gaff and grind of rough and rocky ground — Goodyear's great Hard Rock Lug tires are first choice year after year. For in mine, quarry, dam-building and other construction work that beats the heart out of ordinary tires, Hard Rock Lugs stand up longer, take it better, and come steadily back for more. Years of standout service prove *that*. And today, for all practical purposes, they are the equal of prewar tires in natural rubber content. That's why you'll be time and money ahead with Hard Rock Lugs on *your* rock-work units.

BUY and SPECIFY GOODYEAR—*it pays!*

—and here are the reasons why:

MASSIVE LUG BARS armor the tread and sidewalls against cutting

SELF-CLEANING TREAD doesn't pack up, bites deeper, pulls better

EXTRA-THICK UNDERTREAD lengthens tire life—protects carcass from bruises

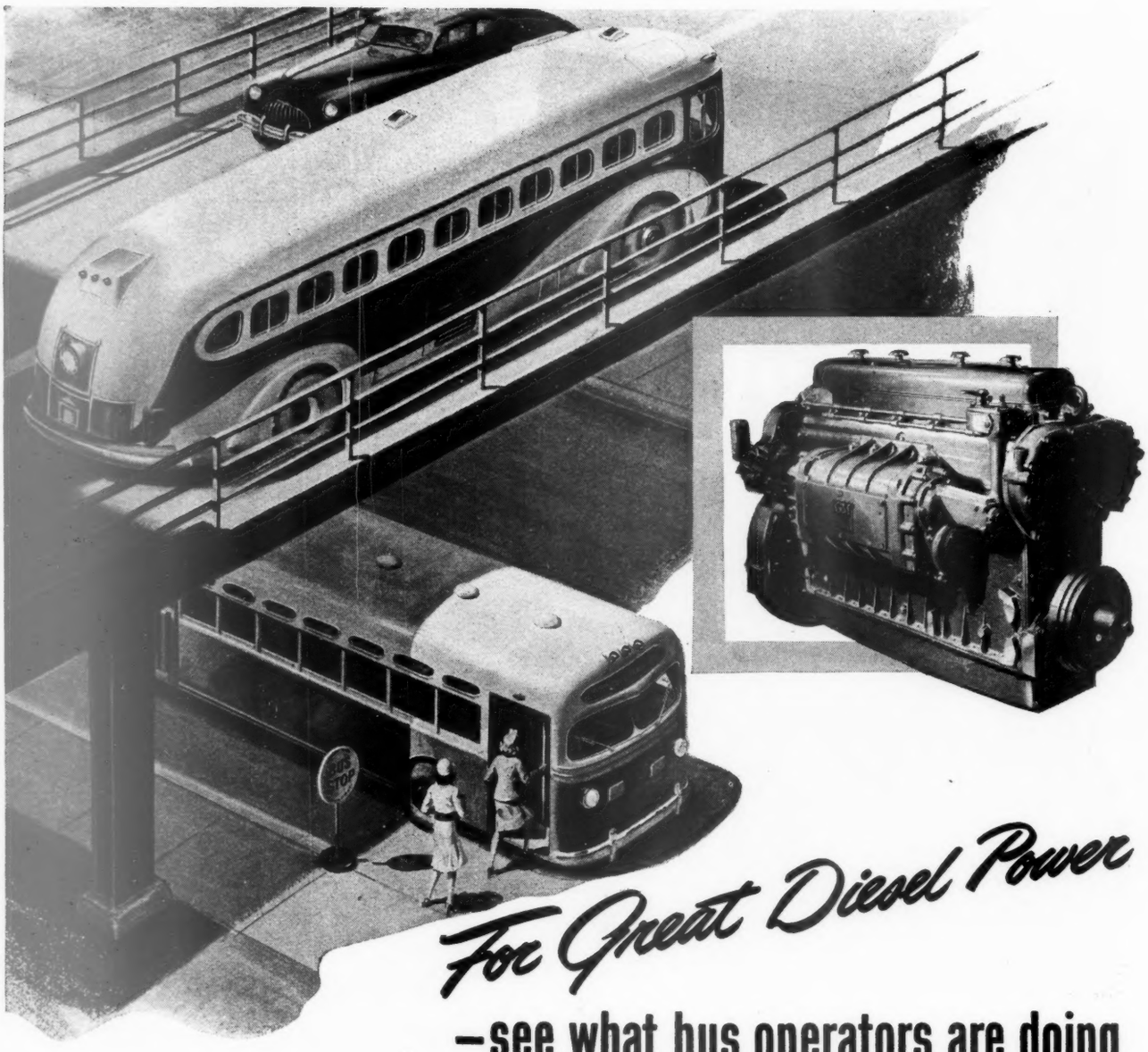
SUPERSTRONG CARCASS of Goodyear's patented Rayotwist Cord—made from rayon — adds more stamina, long life

MULTIPLE BEADS of high-tensile steel wire insure non-slip anchorage to rim

Rayotwist—T.M. The Goodyear Tire & Rubber Company

GOODYEAR

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND



For Great Diesel Power

—see what bus operators are doing

LITERALLY thousands of GM Diesel-powered buses are on America's streets and highways. Many have traveled more than a million miles and are still going strong. They're pulling upgrade smoother, making better time and getting over 50% more miles per gallon, using low-cost fuel.

Because they're powerful and compact, these engines have made it possible for buses to take advantage of all the economy and dependability of Diesel power.

And they can bring these advantages to countless users of power who haven't been able to consider Diesel before.

Whatever needs for power you may have in road-making machinery, cranes, shovels or any other construction material — look to GM Diesels.

Features of GM Diesels Important to Every User of Power

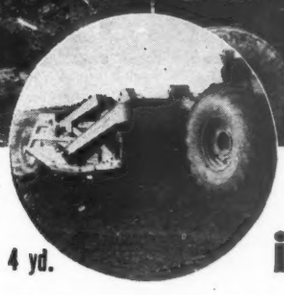
- ***QUICK TO START*** on their own fuel
- ***LOW COST***—run on common fuel oil
- ***EASY TO MAINTAIN***—clean design plus accessibility
- ***LESS FIRE HAZARD***—no volatile explosive fuel
- ***COMPACT***—readily adaptable to any installation
- ***SMOOTH OPERATION***—rotating and reciprocating forces completely balanced
- ***QUICK ACCELERATION***—2-cycle principle produces power with every downward piston stroke

GM
GENERAL MOTORS
DIESEL POWER

DETROIT DIESEL ENGINE DIVISION
DETROIT 23, MICH. • { SINGLE ENGINES . . Up to 200 H.P. / MULTIPLE UNITS . . Up to 800 H.P.
GENERAL MOTORS

How to make your small tractors

earn more money



. . . Keep 'em working more often on more jobs with Carrimor* Scrapers

● Here are two of the greatest little scrapers you've ever seen for working around quarries and gravel pits . . . stripping overburden . . . hauling . . . loading into ramps or ramp bins . . . building roads . . . stock-piling and dozens of other jobs. Choice of 2 or 4 yard capacity for use with small crawler-type or high-speed, rubber-tired industrial tractors. Low in cost. Easy to operate and maintain. Job-proved by extensive wartime use. Write today for complete facts. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, Calif.

LOOK WHAT YOU CAN DO!

● Here's a reasonable estimate of the number of yards moved per hour by LaPlant-Choate C-22 and C-42 scrapers behind high speed rubber-tired tractors of 22-28 DHP and 40-50 DHP respectively. Yardage is based on self-loading in good scraper material, with properly maintained haul roads.

Model	LENGTH OF HAUL IN FEET								Load, Turn and Dump Time	Pay Yards Per Trip
	200'	300'	400'	500'	600'	800'	1000'	2000'		
C-22	38	32	29	26	24	22	21	17	1.5 Min.	1.75
C-42	69	59	55	52	50	46	44	32	1.75 Min.	3.75

*Reg. U.S. Pat. Off.

LaPLANT-CHOATE

Job-Proved Equipment... for Lowest Possible Cost in Moving Earth

Makes it Easier to Complete Contracts

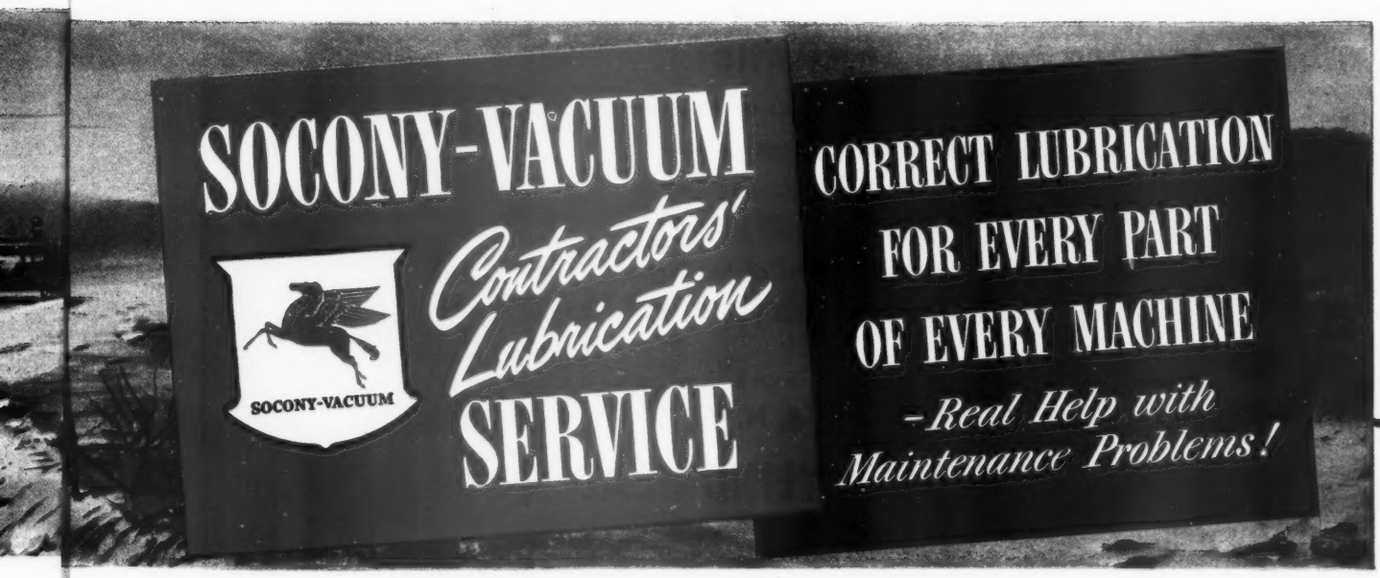
ON TIME!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: Magnolia Petroleum Company, General Petroleum Corporation

This Complete Lubrication Service short-cuts every time problem on your Job!

Are equipment breakdowns delaying vital operations . . . making tight work schedules *tighter?*	Here's *real* help in minimizing machine slow-downs and work stoppages — a service that provides the exactly right oil or grease to protect every part of every machine you use!
Looking for a faster, easier way to refuel and lubricate?	We make regular on-the-job deliveries *anywhere* to help you reduce field interruptions — simplify inventory problems — minimize bother with rush orders and follow-ups.
Losing valuable time fitting stock maintenance plans to your individual needs?	Our representative provides tested maintenance schedules determined by *your* operating set-up, *your* equipment — pitches in and helps your men adapt them to any special requirements.
Are certain "problem" machines throwing *other* machines off schedule — holding up work-progress?	Analyzing and solving equipment problems is part of our representative's training. In critical cases he can also draw on our vast engineering staff for expert lubrication counsel.
Does it take more time than you can spare to train inexperienced men?	Here again, your Socony-Vacuum Representative can help you by instructing "green" men on the Do's and Don't's of Correct Lubrication.

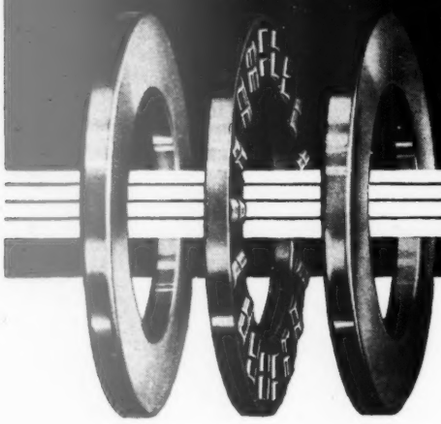
Why Be Satisfied Merely With "Gas and Oil" When You Can Get Complete Service!



BETTER CONTROL OF FRICTION AND STRESS

when Bearings are Loaded the ROLLWAY

RIGHT-ANGLE WAY

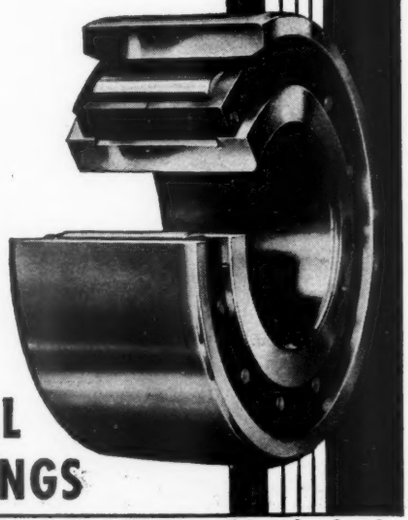


YOU CAN'T engineer friction and stress out of your machines. But you can isolate them, you can control them better. Thus you can achieve preventive control over the shutdowns, delays, loss of manhours, repairs and replacements that they cause.

Rollway's right-angle-bearing-loading helps to isolate and control friction and stress. It splits compound loads into the two components of pure radial and pure thrust. Carries each of these components on separate bearing assemblies, preventing thrust shock and vibration from building up on heavily loaded radial bearings, and vice versa. With each load bearing at right angles to the roller axes, there is no acute-angle stress, no resultants of compound forces to deal with. The result, naturally, is greatly increased life expectancy for the bearing . . . . reduced stress concentrations on arbors, housings and supporting structures . . . . and a marked reduction in servicing and replacement shutdowns.

STANDARD SIZES FOR MOST APPLICATIONS

S. A. E. or American Standard metric dimensions and tolerances in a wide variety of sizes and types assure low cost and ready availability for most applications. Our engineers will help you select the type best suited to your needs. Just send a print, or detailed statement of loads, speeds and operating conditions for free analysis and recommendation. No obligation.



Rollway Bearing Co., Inc., Syracuse 4, N. Y.

ROLLWAY CYLINDRICAL ROLLER BEARINGS

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

PEAK LOADS

AT LOWER COSTS

HENDRIX
Lightweight
DRAGLINE BUCKETS

3/8 to 30 Cubic Yards

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ Manganese Steel chains, fittings, and reversible tooth points.
- ★ Full Pay Load every trip, even in wet diggings.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three Types; light, medium, and heavy duty. With or without perforations.

WRITE OR ASK YOUR DEALER FOR DESCRIPTIVE LITERATURE

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

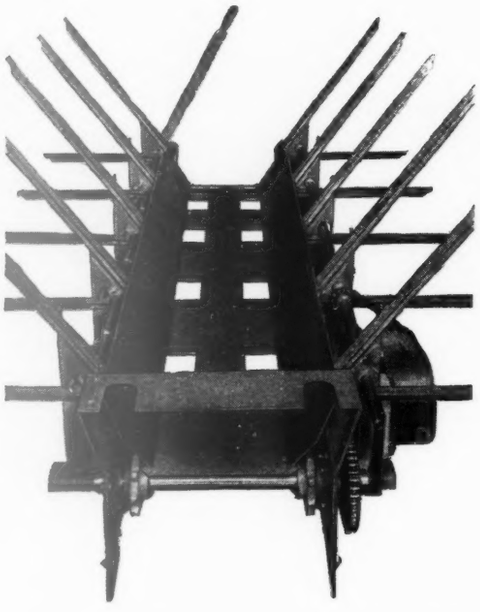
your SPREADING PROBLEMS SOLVED

with "THE NEW LEADER"

Summer or Winter—Wet or Dry there is now a NEW LEADER lime marl and rock spreader to fit your particular problem. With the new electrically welded heavy steel frame plus the wooden hopper you will have a spreader expressly designed to give you many years of hard dependable service. If you are interested in increasing your profits get in touch with us immediately. Don't wait—write or call today!

This is the 11 ft. wide bottom spreader mounted on a long wheel base Ford truck. Standard sizes are 9, 11, 13, and 15 feet. We have found through research that the hopper should be constructed of wood. This eliminates material from freezing to the sides which is so common on the all steel spreaders during cold weather. Thus with THE NEW LEADER you are assured of being able to operate in any weather and still have an even flow and distribution of material.

Here is the electrically welded heavy all steel frame. Notice the sliding doors open changing THE NEW LEADER into a rock spreader. Within your reach from the cab is a single lever which controls the opening and closing of all the sliding doors in the spreader.



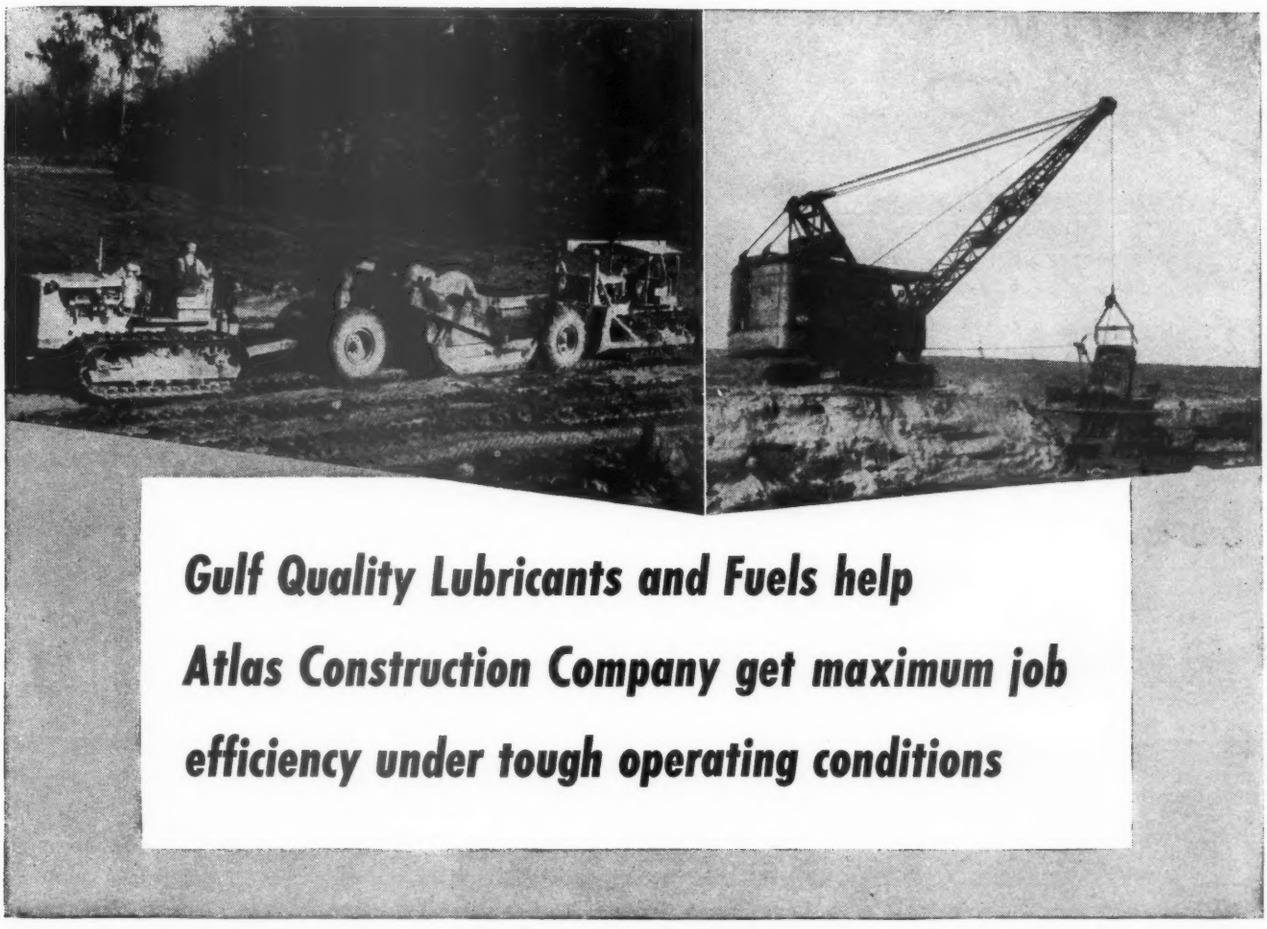
With the extremely wide bottom and the steep sloping sides you are further assured of getting a more even and accurate spread of material. The gear boxes driving the distributor discs are equipped with steel cut gears and ball bearings running in oil in a dust-proof oil-tight gear case. Steel sprockets and heavy duty chains are used.

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS

HIGHWAY EQUIPMENT CO., INC.

CEDAR RAPIDS, IOWA

Gulf Products selected by Contractor on Mississippi's largest levee project



Gulf Quality Lubricants and Fuels help Atlas Construction Company get maximum job efficiency under tough operating conditions

Moving a total of 10,350,000 yards of earth—under difficult operating conditions and against a rigid time schedule—is no small undertaking. It is the kind of job on which the contractor is not likely to take chances with his equipment. He wants proper lubrication and efficient fuels to insure top performance and prevent costly delays caused by breakdowns.

That is why Atlas selected Gulf quality lubricants and fuels for their two Mississippi Levee projects, which they completed well ahead of schedule. Both were a grueling test for men and equipment. On one of the jobs, at Bougere, upwards of 8,500,000 yards were moved—the largest single levee project ever undertaken on the Mississippi River.

The Atlas Construction Company, and many other leading contractors, have formed the habit of using Gulf quality lubricants and fuels as basic profit insurance. They know that Gulf products help speed up the job—keep operating costs at rock-bottom levels.

Call in a Gulf Service Engineer before you start your next job—he will help you complete it more quickly and at a larger profit. Write, wire, or phone your nearest Gulf office today.

GULF

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
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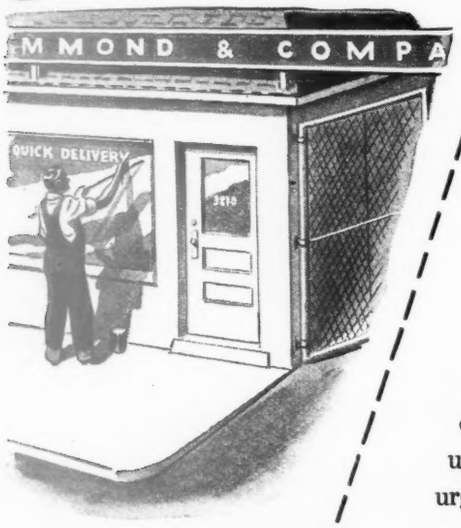
3 REASONS WHY

Many contractors rely on *Job-Rated* dependability



They've found . . . as YOU'LL find . . . that when trucks *fit the job* . . .

1 • You get more *dependable* performance

2 • You enjoy greater *economy*

3 • Your trucks last *longer!*

Dodge *Job-Rated* trucks give you these advantages . . . because they're engineered and built to fit *your* job. Your *Job-Rated* truck will have an engine that's "sized" for *your* loads. It will have the *right* transmission, clutch and every other unit to give YOU better transportation . . . at *lower* cost. Ask owners how well Dodge *Job-Rated* trucks "stood up" through four years of war—and you'll need no further urging to see your Dodge dealer about a truck to fit *your* job!

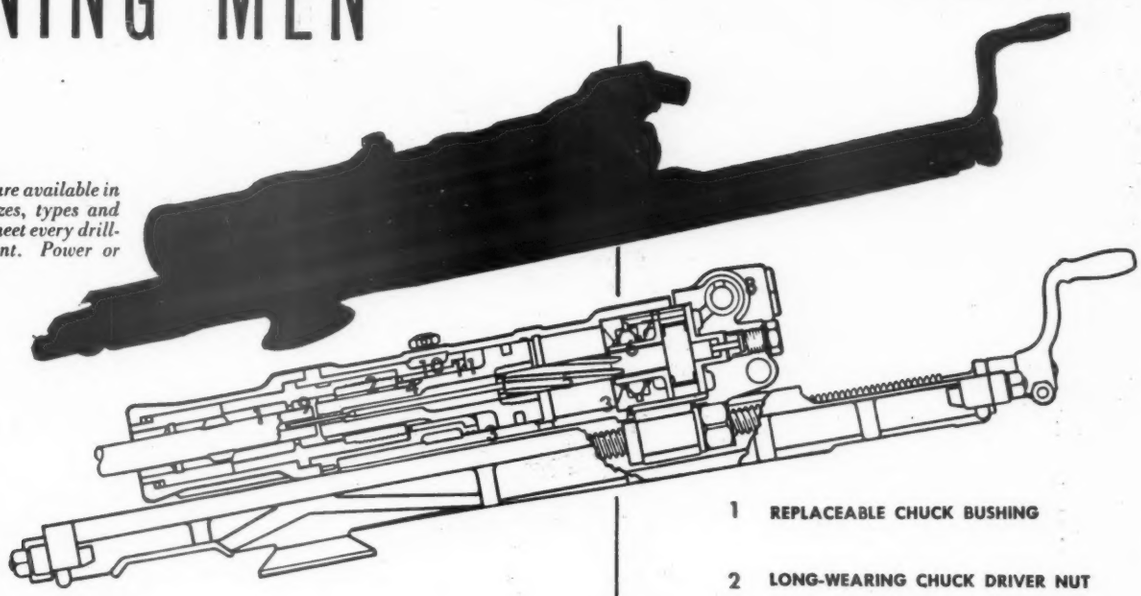
DODGE *Job-Rated* TRUCKS

FIT THE JOB . . . LAST LONGER

DODGE DIVISION OF CHRYSLER CORPORATION

WHY LEADING MINING MEN *specify* Thor DRIFTERS

Thor Drifters are available in a range of sizes, types and mountings to meet every drilling requirement. Power or Hand Feed.



1 REPLACEABLE CHUCK BUSHING

2 LONG-WEARING CHUCK DRIVER NUT

3 FULL AIR CUSHIONING

4 REPLACEABLE FRONT HAMMER BUSHING

5 EXTRA-HEAVY RIFLE BAR

6 SELECTIVE ROTATION SPEEDS

7 LIGHT-WEIGHT, SHORT-TRAVEL VALVE

8 POSITIVE THROTTLE CONTROL

9 EXCEPTIONAL HOLE CLEANING ABILITY

10 CONSTANT, AUTOMATIC LUBRICATION

11 PNEUMATIC PACKING

EXTRA FEATURES like these Reduce Maintenance and Cut Costs while assuring Peak Performance

LOOK at the outstanding design and construction features of this Thor Drifter Rock Drill. To the experienced operator, they spell drilling ability that means more "*bonus rods*" and to the Drill Doctor they spell new records in low-cost operation.

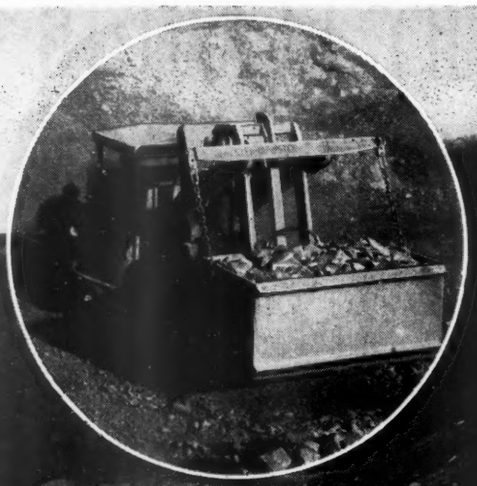
Built with the experience of fifty years of air tool making, Thor Rock Drills have *proved* their ability to increase footage in every kind of formation . . . and show amazing economy at the same time. Before you buy another rock drill, have *your* Drill Doctor check these Thor advantages. Then try a Thor on your property to see how it saves you time and money.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois
BIRMINGHAM BOSTON BUFFALO CLEVELAND DETROIT LOS ANGELES MILWAUKEE NEW YORK
PHILADELPHIA PITTSBURGH ST LOUIS SALT LAKE CITY SAN FRANCISCO TORONTO, CANADA LONDON, ENGLAND

. . . Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

What's Materials Handling Costing You?



IF YOU THINK YOUR COSTS ARE LOW . . . BETTER CHECK THE QUARRIES USING THE DEMPSTER-DUMPSTER SYSTEM!

One close look at the above illustration and you get a rough idea of why the Dempster-Dumpster System of materials handling assures tremendous savings in any quarry. Here twenty-five Dempster-Dumpster heavy-duty bodies of 3-ton capacity each go through continuous, around-the-clock loading while only two trucks, equipped with Dempster-Dumpster Hoisting Units, are constantly on the move hauling loaded bodies to dumping point and returning empty bodies for more loaded ones . . . an endless cycle of efficient, top-production, low-cost service.

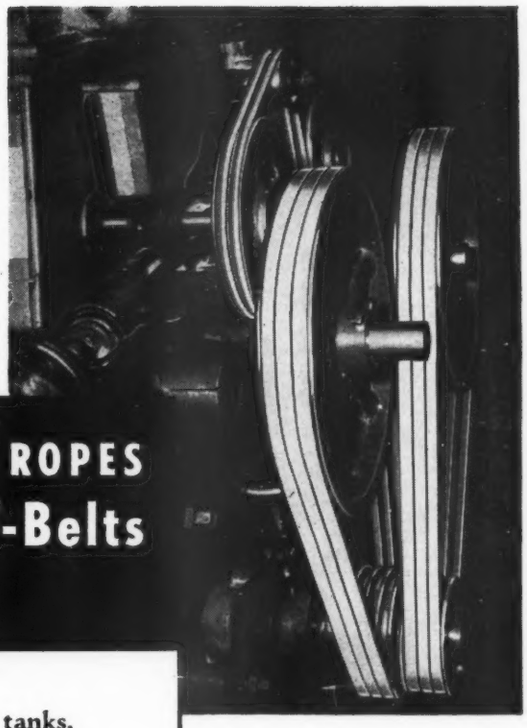
The Dempster-Dumpster system of haulage is recognized by progressive rock, cement and lime plants, throughout the U.S.A. as essential standard equipment for minimum production cost.

But, the Dempster-Dumpster is even more necessary now than ever before. One unit often eliminates 3 out of 4 trucks in previous service . . . and that means cutting costs low. In means eliminating much equipment investment. It means cutting maintenance costs, tire and gas requirements. But most important now, it means increased production with a minimum of manpower.

Our engineers are available to help you meet today's materials handling demand. Write for Catalog 245 that shows exactly how and why the Dempster is necessary for minimum production costs in the rock products field. Dempster Brothers, Inc., 146 Shea Rd., Knoxville, Tennessee.

DEMPSTER DUMPSTER
TRADE MARK REG.

Here's an important fact



GATES *Standard* VULCO ROPES are TODAY *Outwearing* any V-Belts Ever Built Before!

The simple fact that during the war our Army's tanks, tractors and self-propelled big guns required V-belts of a strength and durability never thought possible before is bringing substantial benefits to Gates V-belt users today. That is because Gates developed these greatly superior V-belts for our combat units—and here is why this fact is now important to YOU:--

with this simple reason behind it

Every improvement developed by Gates for U. S. Combat Units— and many later improvements, also—have been added, day by day, to the quality of the Standard Gates Vulco Ropes which have been delivered to you.

As a result, *long before the war was over,* you were getting in your Standard Gates Vulco Ropes a product built to far higher service standards than any V-belts ever built by anyone before the war.

And the improvement by no means ended there. Through continuing *specialized* research, the service qualities of these superior Gates Vulco Ropes have been still further improved as all of Gates facilities and energies have been returned to the service of industry.

These are the simple reasons why the standard Gates Vulco Ropes you are getting today are delivering far better service than any V-belts ever built before!

THE GATES RUBBER COMPANY
DENVER, Colorado
World's Largest Makers of V-Belts

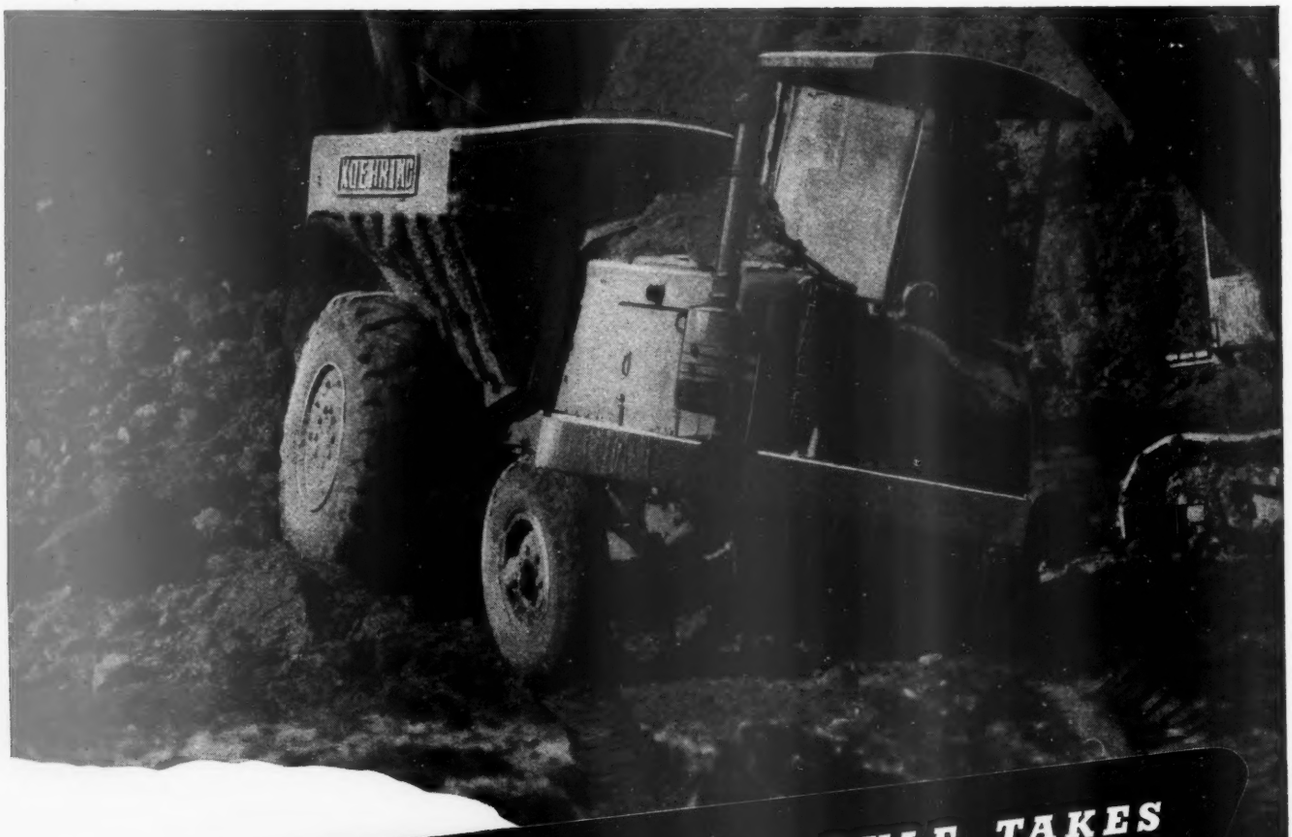
All Gates V-Belts are Built With *The Patented* CONCAVE SIDE

Gates
THE MARK OF SPECIALIZED RESEARCH

466

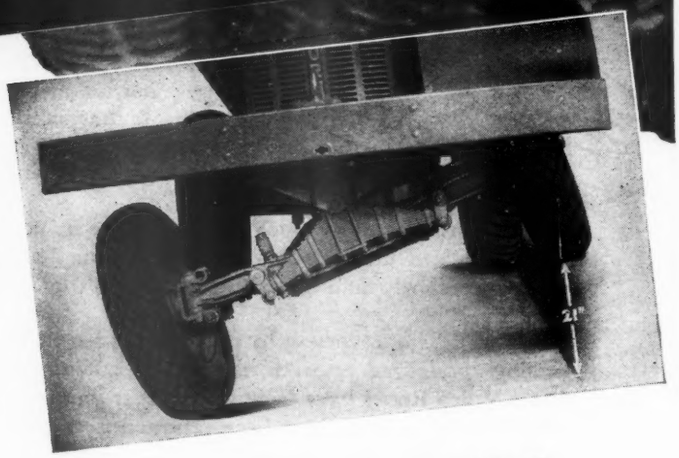
GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries



HIGH STEPPING FRONT AXLE TAKES THE TWIST OUT OF HAUL ROAD TRAVEL

Strip mine haul roads aren't boulevards. But twisting strains of ruts and furrows can't get at Dumptor frames, can't make steering tough for Dumptor drivers. Oscillating action of the steering axle, pivot anchored to the frame at one point only, rides along with the strain. Twist is absorbed before it can distort the frame. Heavy leaf springs cushion vertical shocks. Nickel steel I beam is the heavy-duty backbone of the assembly.



Dumptor can climb 21" furrow without frame distortion. Free oscillating front axle, spring mounted, absorbs twisting strains.

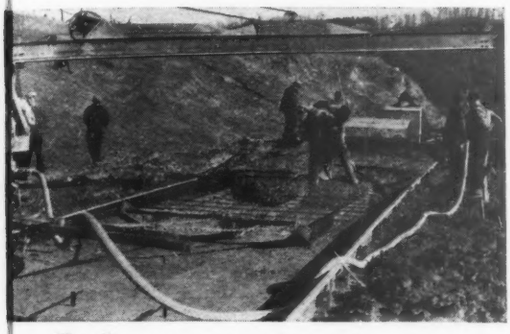
KOEHRING COMPANY *Milwaukee 10, Wis* . . . .

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

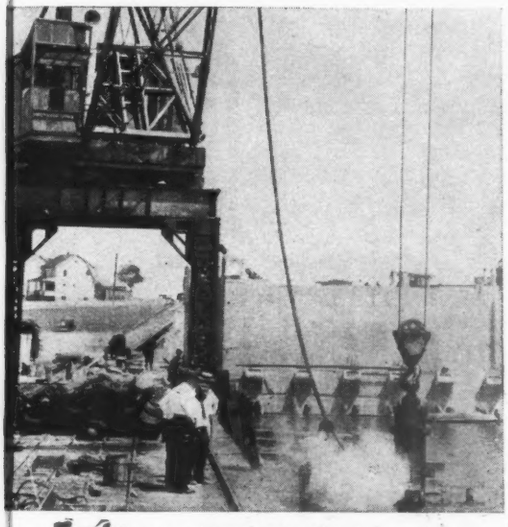
Contractors, Quarriers, Miners *Prefer* MODERN, WELL-BALANCED *Condor* HOSE

Manhattan makes a completely engineered line of hose that has consistently helped to lower costs and speed up schedules. Development of Condor hose constructions has kept pace with advancing methods of operation for more than half a century and today, as always, the Condor line sets the standard for rubber hose. Three factors that make Condor hose "the better buy" are (1) FLEXLASTICS—Manhattan's own rubber compounds, (2) STRENGTH MEMBERS — special construction features, (3) MANUFACTURE and DESIGN — 53 years of high standards.



Condor **HOMO-FLEX WATER HOSE** gives exceptional service on rugged road work where hose is constantly twisted and dragged over rough ground, rocks, stakes, etc. Safe at working pressures of 150 to 350 lbs. per square inch according to diameter.

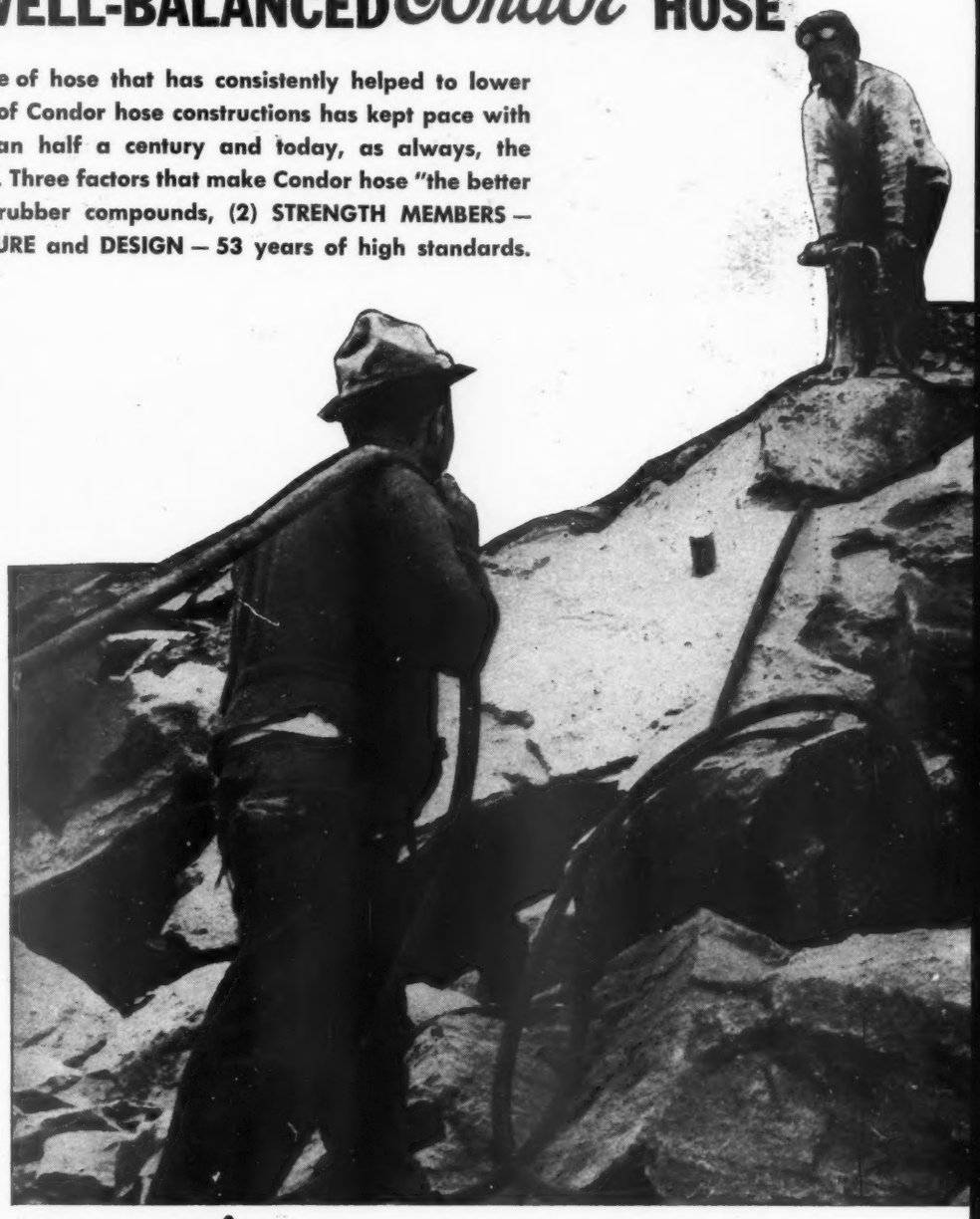
Condor **HOMO-FLEX AIR HOSE** — Freedom from kinking. Lighter, easier to pull in long lengths. Resists the gouging and abrasion of jagged rock and stands the hammering pressure of an air drill. Men like "easy-to-handle" Homo-Flex.



Condor **PILE DRIVER STEAM HOSE** has driven the piles that hold some of the largest structures. Contractors prefer Condor because it is always up to standards of safety and long life.

Condor **HOMO-FLEX SUCTION HOSE,** non-metallic reinforced, for safety in mines and for general service. Returns to original shape if crushed.

Condor **SAND SUCTION HOSE** for heavy duty sand suction and dredging. Engineered to resist collapsing under suction and discharge pressures.



10 ADVANTAGES

OF HOMO-FLEX HOSE

1. Extreme flexibility—easy to handle
2. Resists kinking
3. Light in weight
4. Practically inseparable cover and plies—balanced homogeneous construction
5. Withstands high pressures and surges with wide margin of safety
6. Uniform inside diameter
7. Less elongation and expansion
8. Less fatigue to operator
9. More production
10. Lower ultimate cost

Condor HOMO-FLEX HOSE

Developed by Manhattan engineers to fill a need for a lighter, more flexible, streamlined hose that would last longer than conventional type hose. New Homo-Flex construction withstands destructive pulsations of pressure. Turnate Vulcanization makes an inseparable and uniform nose wall. In services where frequent handling and high pressures break down heavier hose, men are enthusiastic for Homo-Flex, the modern streamlined hose.

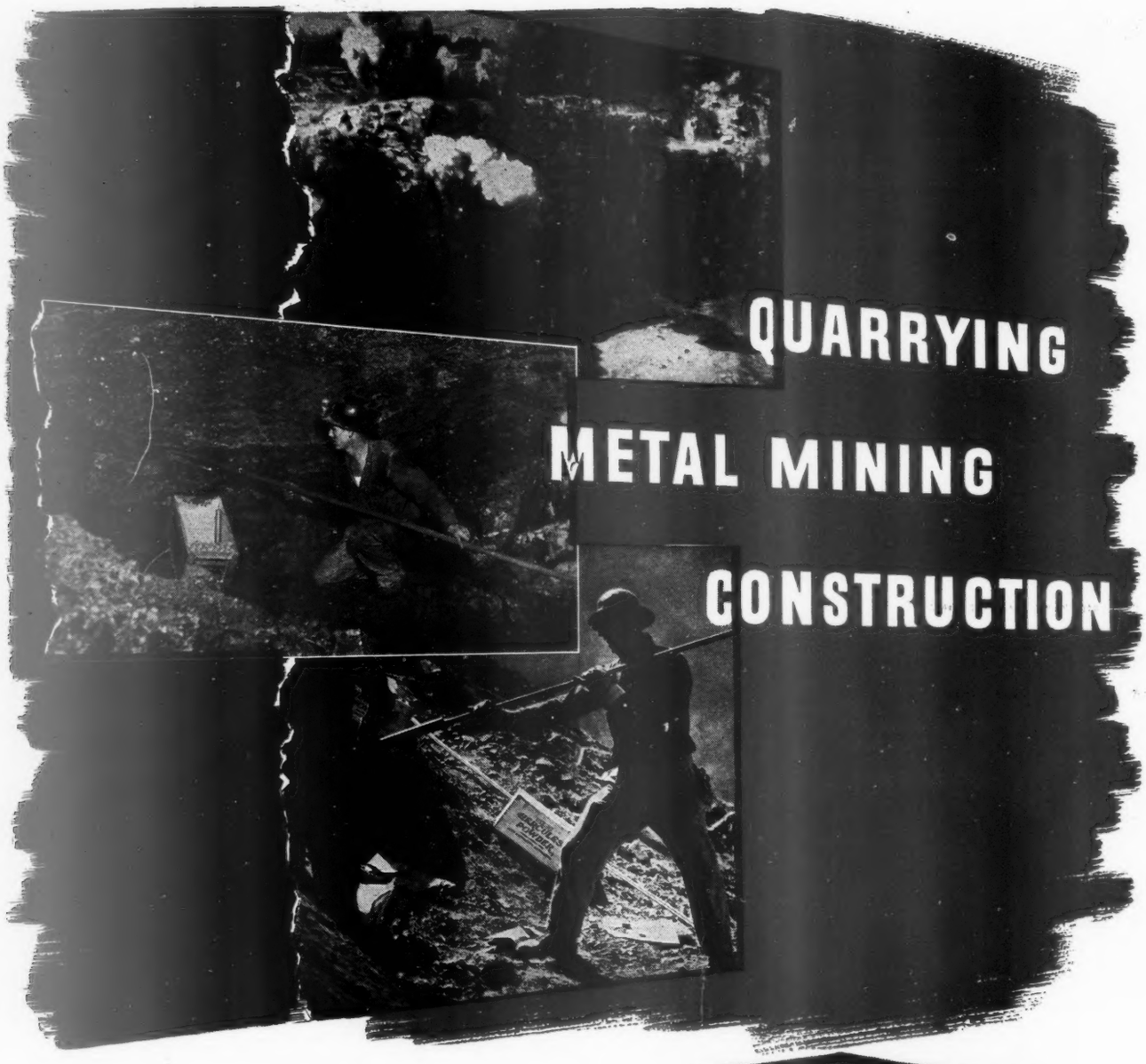
FLEXLASTICS is an exclusive Manhattan trade mark. Only Manhattan can make FLEXLASTICS.

RAYBESTOS R M MANHATTAN

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION

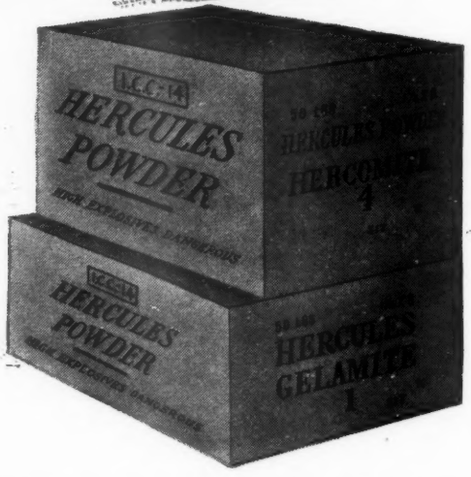
EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSEY



IN quarrying, construction, metal mining, users of Hercomite* and Gelamite* are currently saving 10% to 15% of powder costs compared with older types of explosives.

Whenever their use is indicated, Hercomite and Gelamite give maximum breakage for every dollar. Proof of their efficiency and economy is to be found in their widespread use, both on the surface and underground. These high-cartridge count explosives are now more popular than ever before.

Originated by Hercules, Hercomite and Gelamite are only one example of many outstanding Hercules developments in the field of explosives.



HERCULES POWDER COMPANY
INCORPORATED
960 KING STREET
WILMINGTON, DELAWARE

*Reg. U. S. Pat. Off. by Hercules Powder Company

XR-52

A MESSAGE TO THE CEMENT INDUSTRY

10 BIG ADVANTAGES OFFERED INDUSTRY IN THE "UNION PACIFIC WEST"

1. AVAILABILITY OF RAW MATERIALS
2. ADEQUATE SOURCES OF POWER
3. OPPORTUNITY FOR DECENTRALIZATION
4. NON-RESTRICTIVE LEGISLATION
5. LARGELY NATIVE-BORN LABOR AVAILABLE
6. HEALTHY LIVING CONDITIONS
7. GOOD SCHOOLS
8. GROWING CONSUMER MARKETS
9. INCREASING INDUSTRIAL DEVELOPMENT
10. FAVORABLE DISTRIBUTION FACILITIES*

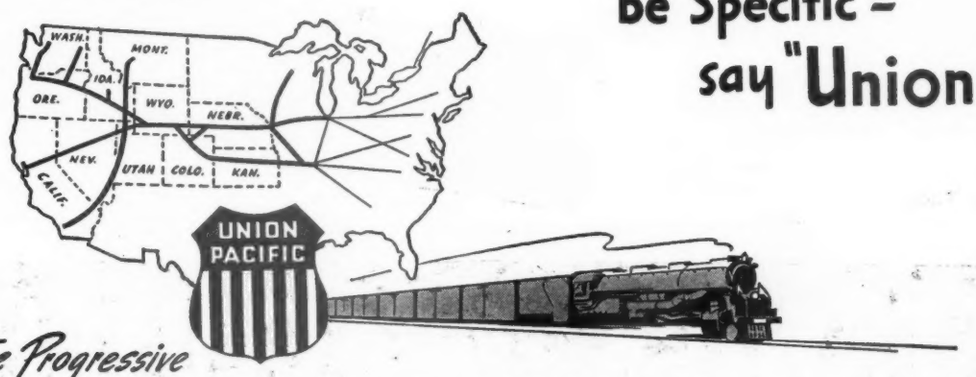
*

Union Pacific—the Strategic Middle Route —unites the East with the Mid-West, Intermountain and Pacific Coast states.

It has facilities and equipment designed to meet industry's heaviest demands. Trained traffic men offer a helpful, cooperative service to all shippers.

For information regarding western industrial sites, write W. H. HULSIZER, General Manager of Properties, Department 101, Union Pacific Railroad, Omaha 2, Nebraska.

be Specific – say "Union Pacific"



The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route

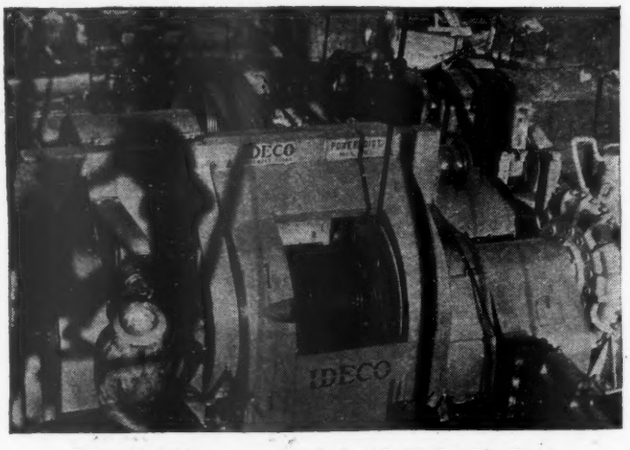
THE CLUTCH THAT STOPPED CLUTCH TROUBLE

Here is the one truly modern clutch for all heavy duty industrial drives.

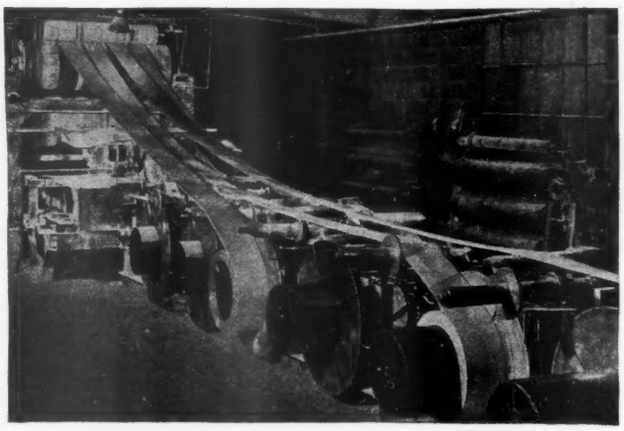
It controls power and torque through a cushion of air —with as firm a grip or as light a grip as the job requires. It has no springs, arms, levers or toggles—requires *no* lubrication and little maintenance.

It is the Fawick Airflex Clutch—proved for superior performance and economy—in hundreds of industrial applications and in thousands of Diesel-driven Navy ships.

Let us help you engineer clutch trouble *out* of your machines. Book on request.



Oil-well drilling rig—equipped with 11 Fawick Clutches.

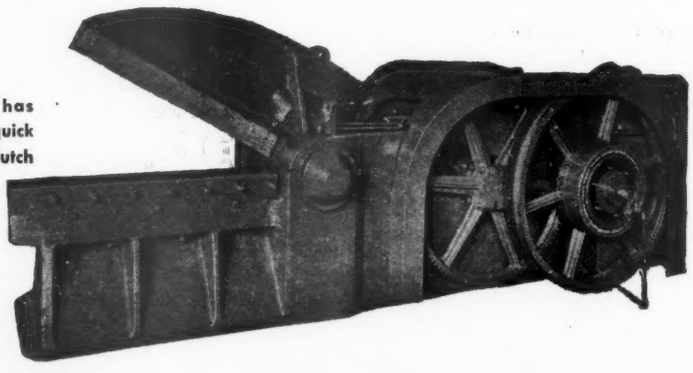


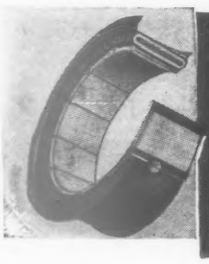
Steel rolling mill Fawick-equipped for smooth, even power.

▲ Modern power shovel gives full-time operation through dependable Fawick Clutches.

◀ Heavy duty press has smooth starts and quick stops with Fawick Clutch and Brake.

▶ Alligator shear operates through Fawick Clutch and Brake.

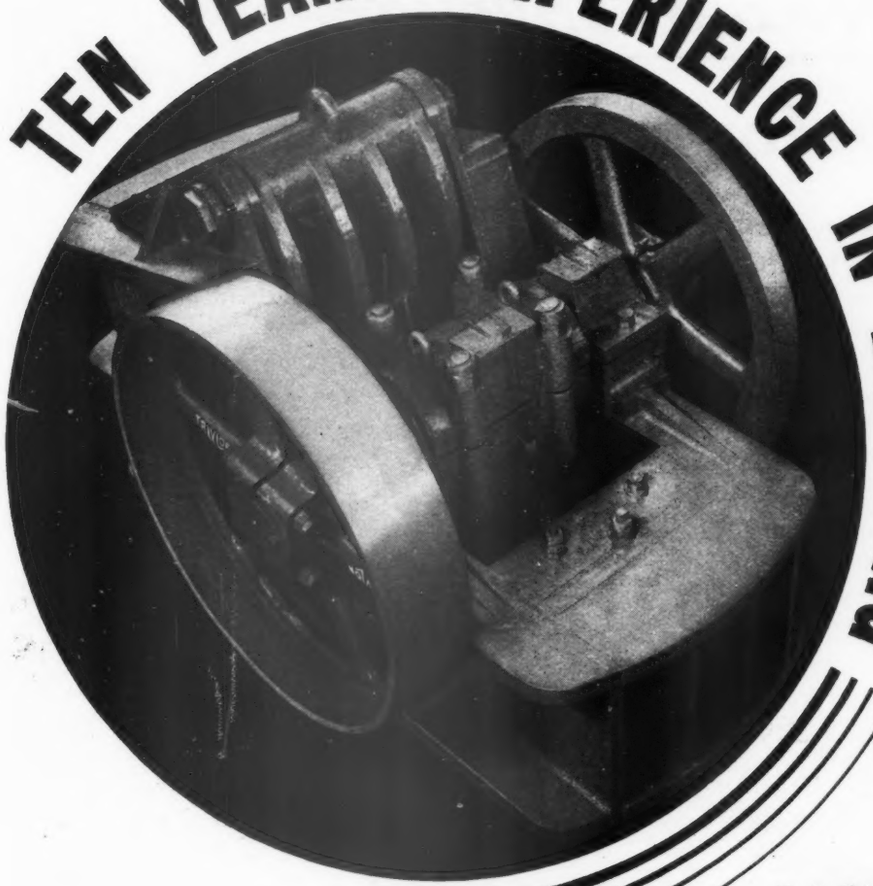




FAWICK *Airflex* CLUTCH

FAWICK AIRFLEX CO., INC. • 9919 Clinton Road, Cleveland 11, Ohio

TEN YEARS EXPERIENCE IN BUILDING



TYPE H
JAW CRUSHERS

WE BUILD

- Jaw, Gyratory and Reduction Crushers
- Crushing Rolls
- Grinding, Ball, Tube and Rod Mills
- Grizzleys and Feeders
- Classifiers
- Samplers and Jigs
- Furnaces
- Settlers
- Crucibles
- Forehearths
- Casting Machines
- Complete Milling and Smelting Plants
- Rotary Kilns, Coolers and Dryers

Efficient crusher design and construction begins with experience. Traylor Type H Jaw Crushers have been designed and built by our experienced engineers for the past ten years to operate continuously at maximum production.

The main feature that makes this an unusually strong and efficient crusher is the all-welded steel frame. It is of sufficient depth to give a small angle, which, together with the curved jaw plates, results in the highest efficiency in capacity and size of product.

Other features are . . . separate Pitman Shaft Bearings—simplified and improved Swing Jaw Suspension, which saves wear and power—Curved Jaw Plates, which eliminate all choking.

There are many other distinct advantages in this crusher which it will pay you to investigate.

Write us and ask our representative to call at your convenience to help fit it into your particular requirements. or Send for Bulletin No. 2105.

TRAYLOR
ENGINEERING & MANUFACTURING CO.
MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

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EXPORT DEPARTMENT
104 Pearl St., New York City

CANADIAN MFRS.—CANADIAN-VICKERS, LTD.
P.O. Box 550 Place D'Armes Station, Montreal, Canada

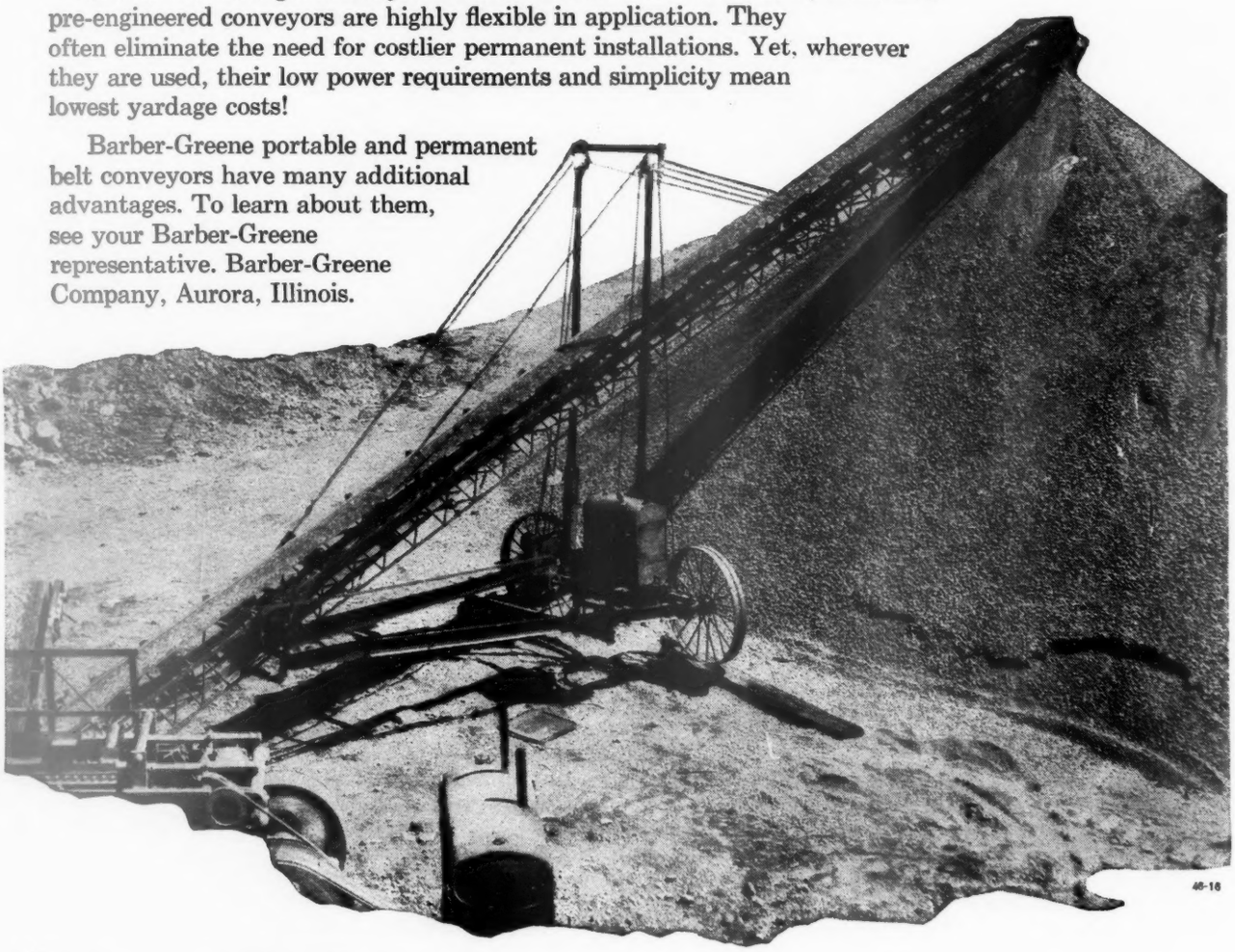
Why B-G Portable Conveyors do so much—for so little

• B-G portable belt conveyors keep materials on the move at a constant flow that means high daily capacity wherever they're put to work.

They can move all over the job, the quarry, the supply yard—stock piling and loading everything from sand to cement, crushed rock to coal.

Shortened or lengthened by the addition or removal of sections, these B-G pre-engineered conveyors are highly flexible in application. They often eliminate the need for costlier permanent installations. Yet, wherever they are used, their low power requirements and simplicity mean lowest yardage costs!

Barber-Greene portable and permanent belt conveyors have many additional advantages. To learn about them, see your Barber-Greene representative. Barber-Greene Company, Aurora, Illinois.



48-18

B-G Barber-Greene

CONSTANT FLOW EQUIPMENT

LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES

GENERAL ELECTRIC

Announces . . .

NEW

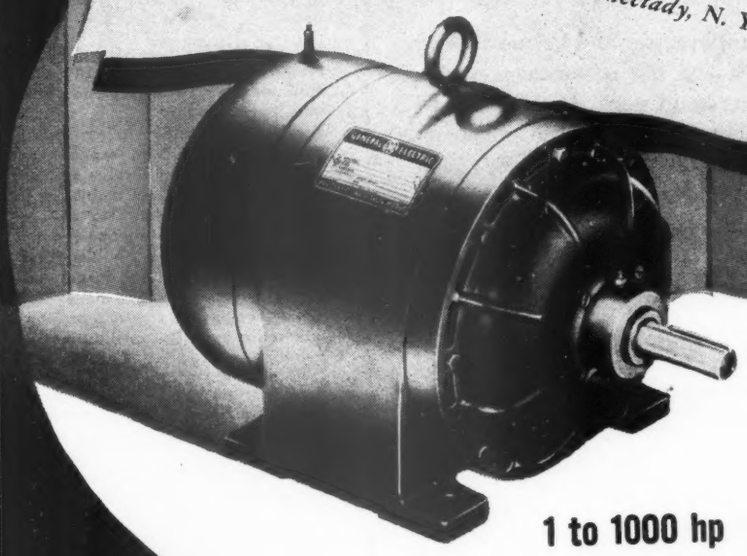
Totally Enclosed TRI CLAD MOTORS

In 1940, G.E. introduced the Tri-Clad open motor—with emphasis on the feature that industry wanted most in a motor, *protection.* Since then, more Tri-Clads have gone into service than any other integral-horsepower motor.

Today, we are ready with a new line of Tri-Clad motors—*totally enclosed, fan-cooled motors*—built on Tri-Clad design principles in both standard and explosion-proof types.

We believe that these are industry's most dependable motors. They are designed specifically for use in many adverse atmospheres—in iron dust, outdoors, in hazardous areas, and chemical atmospheres. Their scope of application is as wide as the field of industrial motor use. Safe-guarded against most sources of motor damage, their longer life and lower maintenance will make them economical motors for use on almost every job. *General Electric Company, Schenectady, N. Y.*

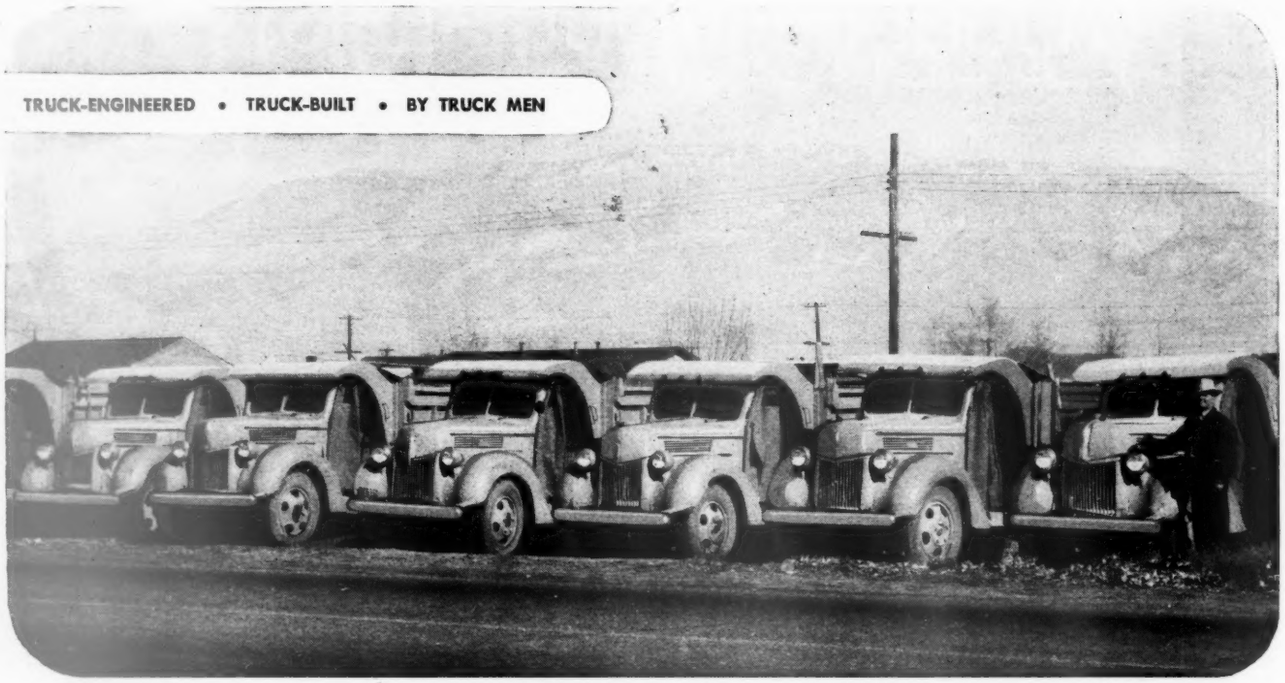
750-260-8030



1 to 1000 hp

COMPLETE ENCLOSURE FOR PROTECTION AGAINST DIRT, DUST, AND WEATHER

Ford Trucks Last Longer



"MY 12 FORDS OUT-HAUL OTHER NEWER UNITS, AND AT LESS COST"

"I have hauled sand and gravel out of pits when other trucks have not been able to make it, in spite of the fact that my Fords carry a 40 per cent bigger bed than most of the others," wrote Mr. L. D. Alexander, of Albuquerque, New Mexico, not long ago.

"These twelve Ford 1½-ton Trucks have seen more than three years' service, and they're still more economical to operate than some newer models on the same job," Mr. Alexander continued. *"My equipment is ideal for hauling coal, also—which I do in the wintertime."*

The ample power and torque of Ford engines are big advantages which show up in pit work. And the rugged channel-reinforced frame construction and sturdy axle design for which Ford Trucks are noted prove their stamina under the shovel.

There's a Ford unit of 2-ton rating now, with two-speed axle and 8.25-20 dual rear tires. Heard about it? See your Ford Dealer! And ask him about the 32 new engineering advancements designed to save you money and make your new Ford Trucks last still longer!

Ford

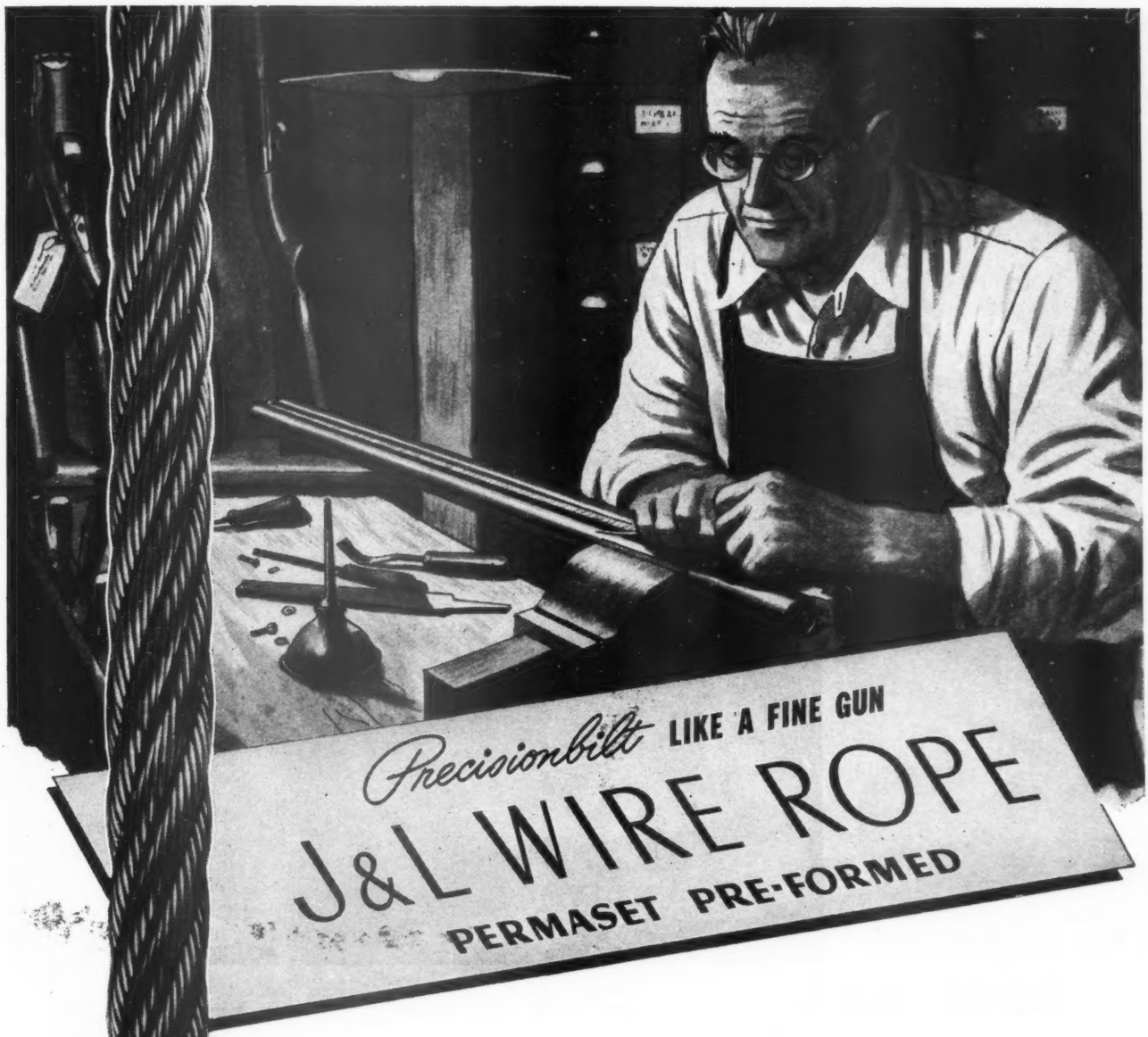
FORD ADVANCED ENGINEERING!

THE FAMOUS V-8 ENGINE, for toughest service, now 100 HP, with NEW steel-cored Silvaloy rod bearings for trebled endurance • NEW Flightlight aluminum alloy 4-ring pistons for added oil economy • Tougher, rust-proofed valve springs • NEW moisture-sealed distributor • NEW coolant-saving radiator closure • Auto-balanced carburetion for still more thrifty power • Servicing simplified still further. And the rugged, thrifty 90 HP Ford six-cylinder engine, for stop-and-go jobs, with many important advancements, available in all except C.O.E. chassis.

Ford Truck rear axles—world-famous for load-lugging—provide generous reserve capacity • Light duty chassis have sturdy ¾-floating axles with triple-roller-bearing, straddle-mounted pinion; full-floating axles in all other chassis • 2-speed axle and vacuum power braking for 2-ton rating • Improved 4-speed transmission at extra cost in light duty chassis, standard in all others.

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE



J&L Wire Rope is made with precision by skilled men with the same patient attention to detail, the same insistence upon quality material, as the best hand-made match piece.

J&L Permaset Wire Rope is pre-formed to give it longer life. It hits the target on service. Write for more information.

J&L STEEL

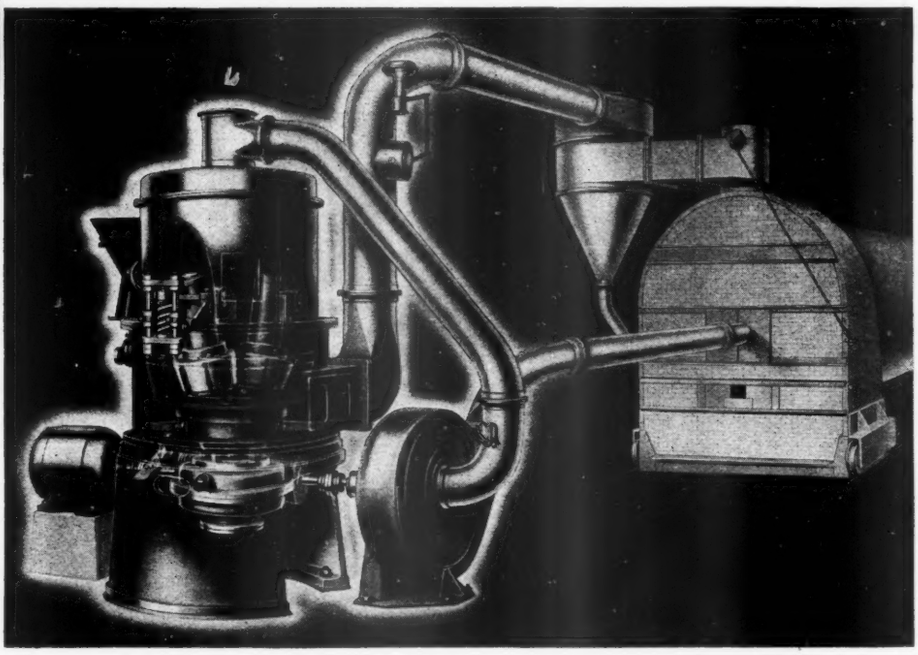
JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

.....and try to hear the BOWL MILL



The Raymond BOWL MILL

. . . runs so smoothly and quietly that you can hardly tell it is operating except by the whirr of the motor or the rotation of the drive shaft.

It runs so free of vibration that a coin . . . balanced on the top plate of the mill . . . will remain standing on edge while the machine is pulverizing.

All this points to the finely engineered construction of the Bowl Mill . . . worm gear drive, precision shafts and bearings, automatic lubrication, balanced rotating bowl, and absence of metal-to-metal contact between the grinding surfaces.

For long-term over-all economy, install the Bowl Mill for direct-firing cement, lime and dolomite kilns or industrial furnaces.

It handles any grade or moisture coal . . . has thermostatic control . . . easy 3-point control of fineness . . . adjustable for wear . . . automatic tramp iron disposal.

See Raymond Catalog No. 43 for details of the BOWL MILL.

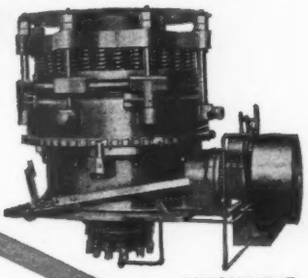
RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street CHICAGO
Sales Offices in Principal Cities . . . In Canada, Combustion Engineering Corporation, Ltd., Montreal

SINCE 1887

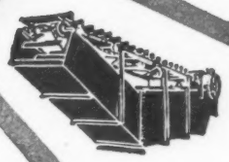
TELSMITH GRAVEL PLANT and QUARRY *Equipment*

When you modernize, expand or build a new plant—Telsmith machinery is the right answer to your production problems. From crushers to bin gates, every unit is designed, engineered, and built "right" *by Telsmith.* And Telsmith selective engineering service fits it to do the job you want done at the lowest operating cost. To push production to new peaks—buy Telsmith. Get Bulletin E-15.

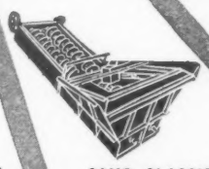
SAND TANKS



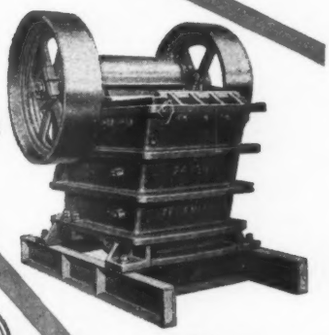
GYRASPHERE CRUSHERS



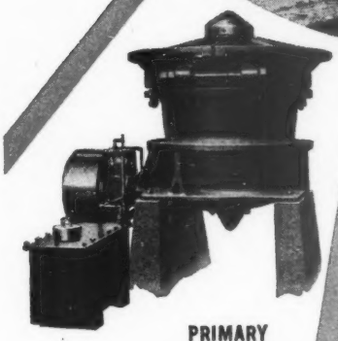
SAND DRAGS



SAND CLASSIFIERS



JAW CRUSHERS

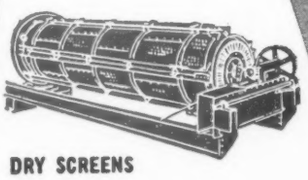


PRIMARY BREAKERS

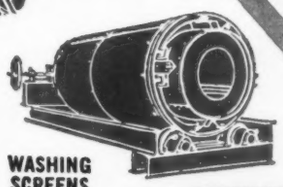
GRIZZLIES

BELT AND BUCKET ELEVATORS

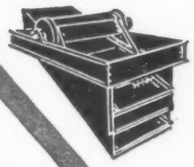
HEAVY DUTY FEEDERS

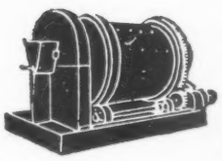


DRY SCREENS

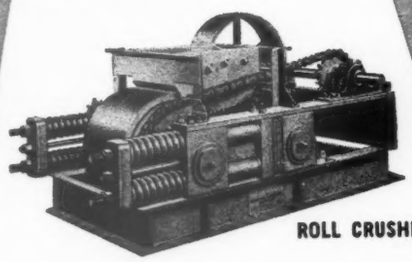


WASHING SCREENS

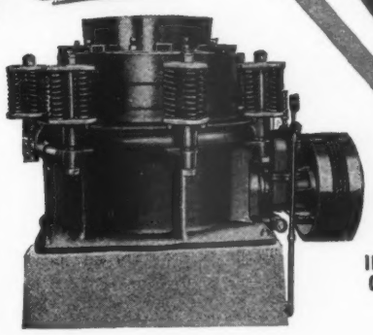




SUPER SCRUBBERS



ROLL CRUSHERS



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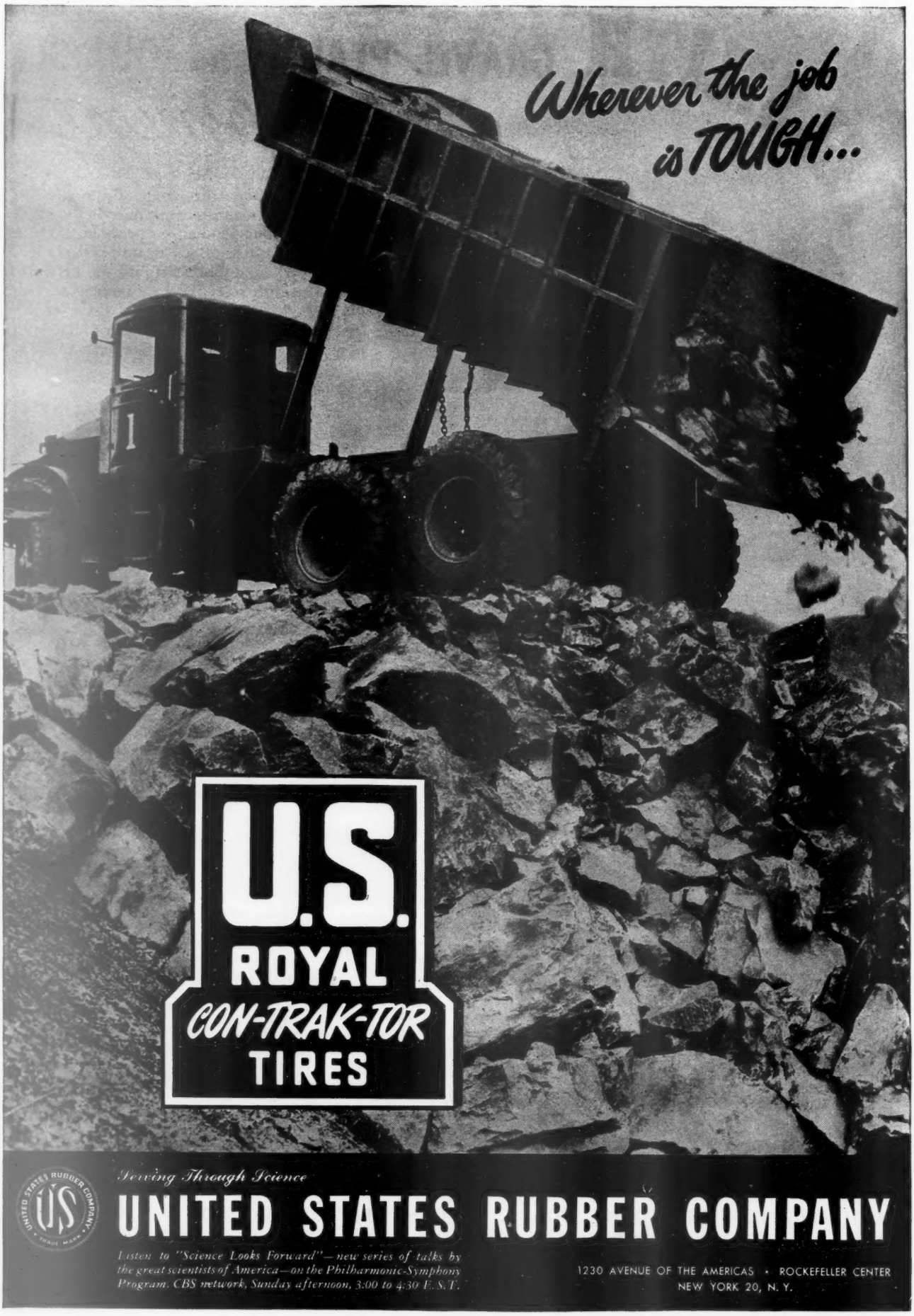

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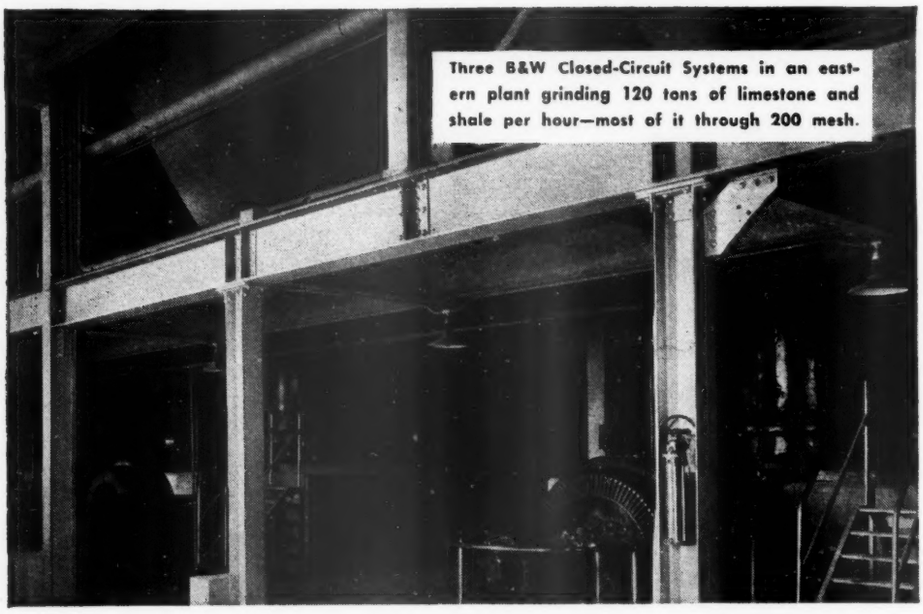

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Limestone, shale and other raw materials are ground *and* dried automatically and simultaneously *within* the B&W Closed-Circuit System. No separate drying equipment is needed.

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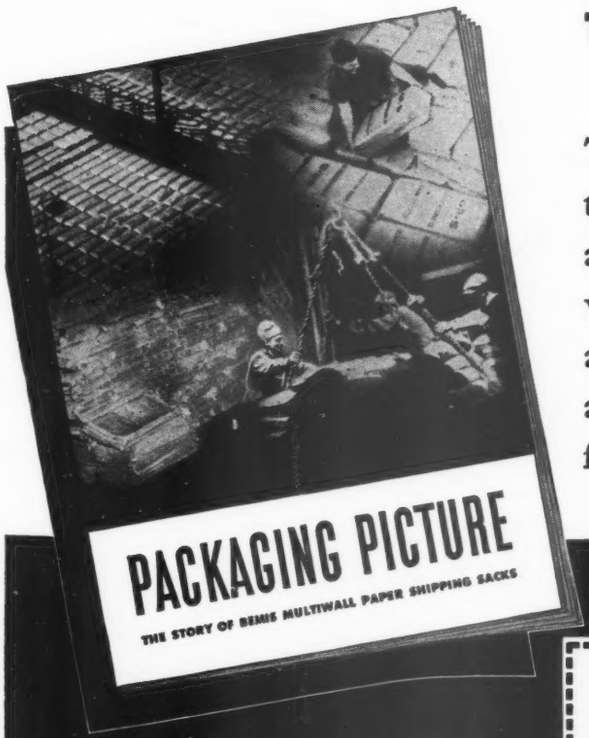

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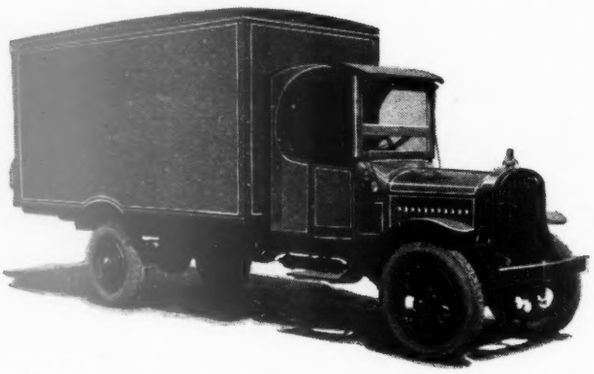
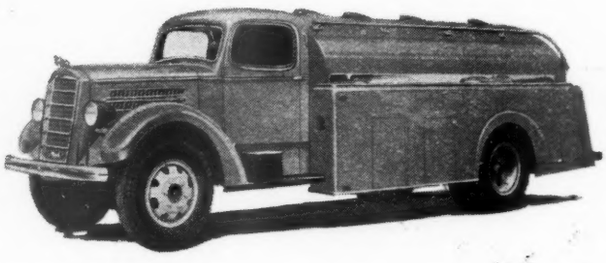
Half a Century of Truck Progress... A PICTURE HISTORY

1906 The first Mack commercial gasoline vehicle was delivered in **1900**. It operated as a bus and later as a truck for 17 years. By 1906, the automotive industry's tenth birthday, Mack trucks had many advanced features, including the "high cab" (above), granddaddy of today's cab-over-engine design.

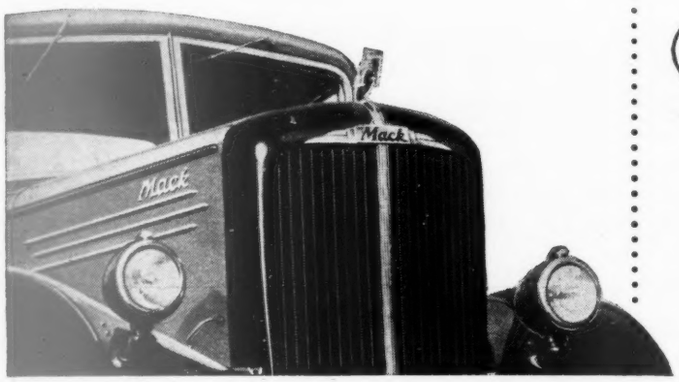
1916 Ten years later came the famous AC "bulldog" model which made the phrase "built like a Mack truck" a popular synonym for rugged strength. You can still see many of these trucks grinding along through city streets, steadfastly making money for their owners and looking quite at home in modern traffic.



1926 More powerful engines were being used, and by 1926 pneumatic tires were fast displacing solids and making possible greater road speeds. These progressive trends, plus certain exclusive refinements of Mack engineering, were embodied in the Mack AB.



1936 An important milestone in truck history was the introduction, in 1936, of the now widely-used Mack EH—a model which surpassed anything previously attained in truck performance.



1946 Today, with World War II experience crowning its 46 years of production, Mack again takes the lead in building the world's hardest-working trucks . . . ***trucks which set industry standards for stamina, performance, economy and long life.***

The Automotive Industry's 50th Anniversary is Mack's 46th

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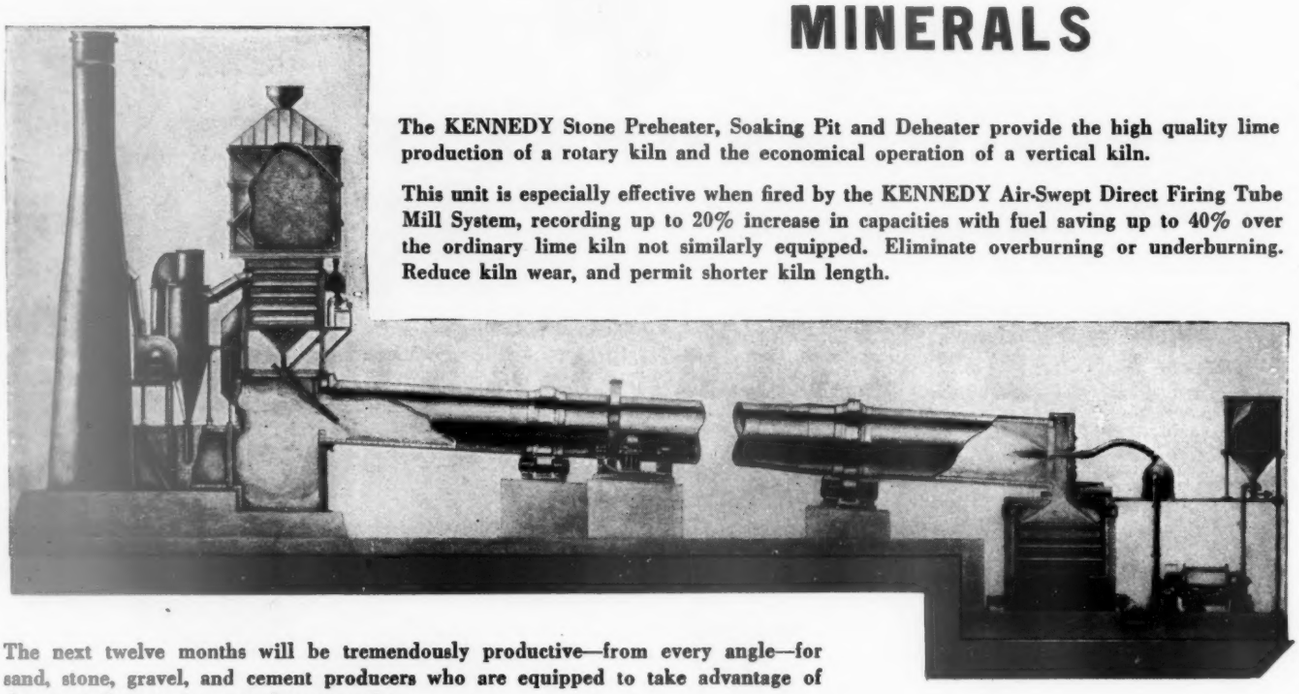

The KENNEDY Stone Preheater, Soaking Pit and Deheater provide the high quality lime production of a rotary kiln and the economical operation of a vertical kiln.

This unit is especially effective when fired by the KENNEDY Air-Swept Direct Firing Tube Mill System, recording up to 20% increase in capacities with fuel saving up to 40% over the ordinary lime kiln not similarly equipped. Eliminate overburning or underburning. Reduce kiln wear, and permit shorter kiln length.

The next twelve months will be tremendously productive—from every angle—for sand, stone, gravel, and cement producers who are equipped to take advantage of the upward surge in general construction.

Many highly successful installations, already with imposing war-time production records because of super-performing KVS machines, are ready to meet any demands by a fast-growing market.

KVS units combine durability, high output, and operating economy to assure "a banner year *every* year" for plants specializing in the use of this modern equipment.

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This KVS unit does *more* work than any geared crusher, and costs *less* for operation, maintenance and repairs.

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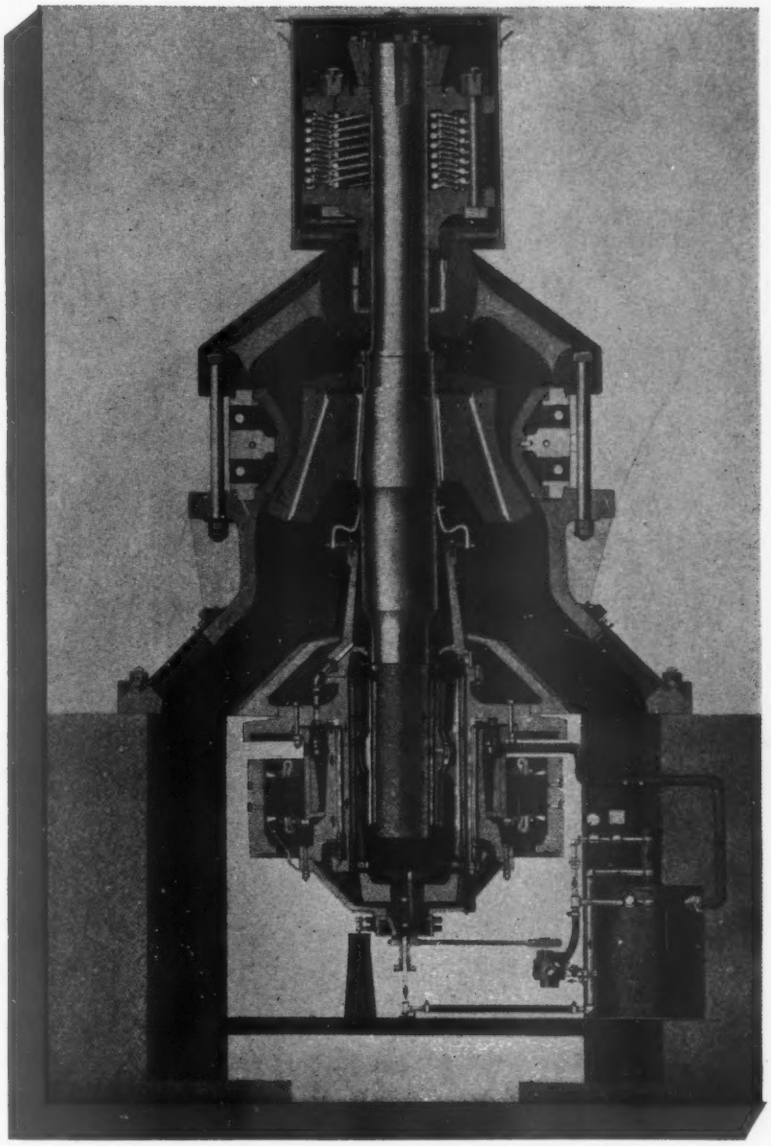
Reversible concaves or grinding ring for extra wear. Forced feed lubrication. Quick adjustment of crusher opening. Easy accessibility.

KENNEDY Ball-Bearing Gearless Gyratory Crushers are also available in standard and short-shaft types. Wide range of capacities.



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Select the type of Primacord best suited to your particular job. Then use it, and *forget* the dangers of stray currents from electrical storms and power lines. For with Primacord — and Primacord alone — no cap *ever* goes into the hole . . . no cap is *ever* attached until just before the blast.

Consider, too, these other advantages you get with Primacord . . .

- A tried and proved time delay feature for more efficient shot sequence.
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- The light weight of Primacord makes for easier handling on the job.
- A system for faster hooking-up with square knots and half hitches, in plain sight, makes for easy hook-up inspection.

It's easy to see why Primacord with all these advantages is still the recognized favorite with pit and quarry operators everywhere.

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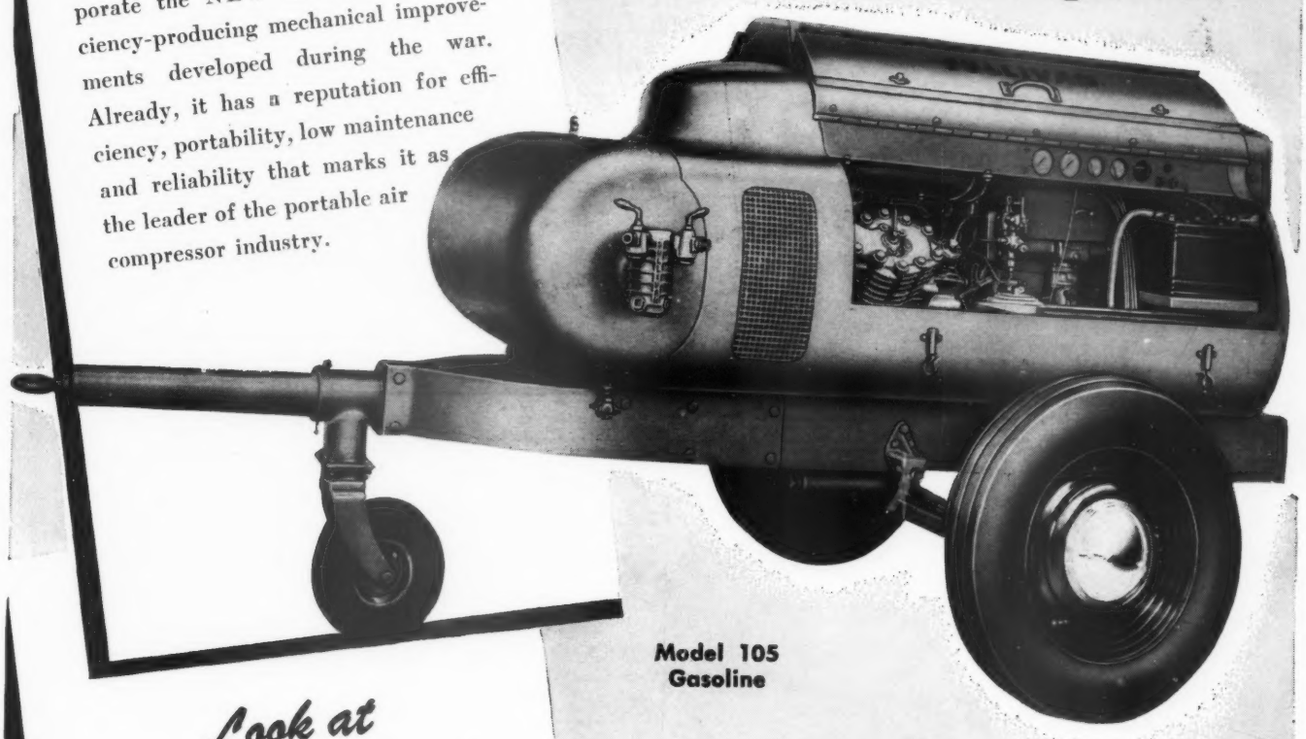
The new Sullivan Series 80 is the first portable air compressor to incorporate the NEW materials and efficiency-producing mechanical improvements developed during the war. Already, it has a reputation for efficiency, portability, low maintenance and reliability that marks it as the leader of the portable air compressor industry.

the New SULLIVAN Series 80 Portable Air Compressor



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Here's the portable compressor you've been waiting for! It has every desirable feature that you are familiar with in a Sullivan portable, plus a lot of new ones that will make you agree that the new Series 80 is the finest portable on the market. You have never seen so much air-power, efficiency, portability, low maintenance and reliability packed so efficiently in so little space. The new Sullivan Series 80 is offered with gasoline or diesel engines and in many different sizes and mountings. See your nearest Sullivan distributor or branch office for all the details or send for Bulletin A-55. Sullivan Machinery Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.

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The Application of "800 Series" Flotation Reagents in the Beneficiation of CERAMIC RAW MATERIALS

GLASS SAND

Problem: Reduction to less than 0.02% Fe_2O_3 of iron-bearing impurities mainly present as chlorite.

Results: Using Reagent 801 for flotation of iron minerals.

Product	% Weight	% Fe_2O_3 Analysis	% Fe_2O_3 Distribution
Feed	100.0	0.040	100.0
Concentrate (iron minerals)	6.58	0.424	69.6
Tailing (glass sand)	93.42	0.013	30.4

FELDSPAR ORE

Problem: Removal of biotite, tourmaline, garnet, iron oxides.

Results: Using Reagent 801 for flotation of iron minerals.

Product	% Weight	% Fe_2O_3 Analysis	% Fe_2O_3 Distribution
Feed	100.0	0.236	100.00
Concentrate (iron minerals)	9.55	2.16	87.38
Tailing (feldspar)	90.45	0.033	12.62

LOW GRADE FELDSPAR DUMP ORE

Problem: Production of glass spar by reducing the iron impurities mainly in the form of biotite and iron oxides.

Results: Using Reagent 801 for removal of iron; cationic collector for flotation of feldspar.

Product	% Weight	Analysis % Fe_2O_3	Analysis % Al_2O_3	Distribution % Fe_2O_3	Distribution % Al_2O_3
Feed	100.00	1.82	12.61	100.0	100.0
Concentrate (iron minerals)	16.1	10.59	16.66	93.96	21.33
Concentrate (feldspar)	56.1	0.12	17.16	3.85	76.21
Tailing	27.8	0.13	1.12	2.19	2.46

FELDSPAR ORE

Problem: To produce glass spar and silica sand suitable for use as glass sand, by removing iron impurities in the form of biotite, iron oxides, etc.

Results: Using Reagent 801 to float the iron minerals and a cationic type promoter to float the feldspar, leaving as a tailing a marketable-grade glass sand.

Product	% Weight	Analysis % Fe_2O_3	Analysis % Al_2O_3	Distribution % Fe_2O_3
Original Feed	100.00	0.506		100.0
Slimes (discard)	6.10	0.75		9.09
Flotation Feed	93.90	0.49		90.91
Concentrate #1 (Iron)	12.21	3.36		81.23
Concentrate #2 (Feldspar)	59.36	0.07	18-19%	8.30
Quartz Tailing	22.33	0.031		1.38

Developed principally for the treatment of Iron Ores and washery waste of the Mesabi, Cyanamid's new "800 Series" Reagents and new processes have practical applications in reducing iron-bearing impurities associated with Glass Sands and Feldspar and other minerals such as Kyanite, Sillimanite and Nepheline Syenite.

Typical results (left) illustrate the effectiveness of "800 Series" Cyanamid Reagents. But these are merely indicative of potential applications in non-sulphide flotation where selective reagents and economical, effective processes are required to treat low-value non-metallics.

AMERICAN CYANAMID COMPANY — PRODUCTS

TYPICAL NON-METALLIC and METALLIC OXIDE MINERALS that can now be Beneficiated by Processes and Reagents Offered by Cyanamid

- BARITE
- CEMENT ROCK MINERALS
- COAL
- FELDSPAR
- FLUORSPAR
- GARNET
- GLASS SANDS
- GRAPHITE
- GYPSUM
- ILMENITE
- IRON ORE
- KYANITE
- MAGNESITE
- NEPHELINE SYENITE
- OLIVINE
- PHOSPHATE ROCK
- SILLIMANITE
- SCHEELITE
- SPODUMENE
- WOLFRAMITE

For the past several years a considerable part of the personnel and resources of the Cyanamid Mineral Dressing Laboratory has been focused upon non-metallic mineral beneficiation. Many thousands of hours of pure and applied research have been devoted to the search for new low-cost reagents and the development of processes for their effective use.

For the beneficiation of non-metallic minerals at a size coarser than can be treated by froth flotation, Heavy-Media Separation Processes offered by Cyanamid can be used either as a pre-concentration step or for the production of marketable products. These processes, already in large-scale use in a number of plants, are successfully separating valuable non-metallic minerals from gangue, although the difference in their specific gravities may be as low as 0.05.

What we have learned about efficient non-metallic beneficiation is freely available to interested metallurgists through Cyanamid Field Engineers. Your inquiry will have prompt, intelligent and completely confidential handling.

Shown below is the Fagergren Flotation Machine (direct mechanical type) which together with the Steffensen Flotation Machine (free-air type) is offered by Cyanamid for the more efficient beneficiation of Ceramic Raw Materials. Information on these machines will be sent upon request.

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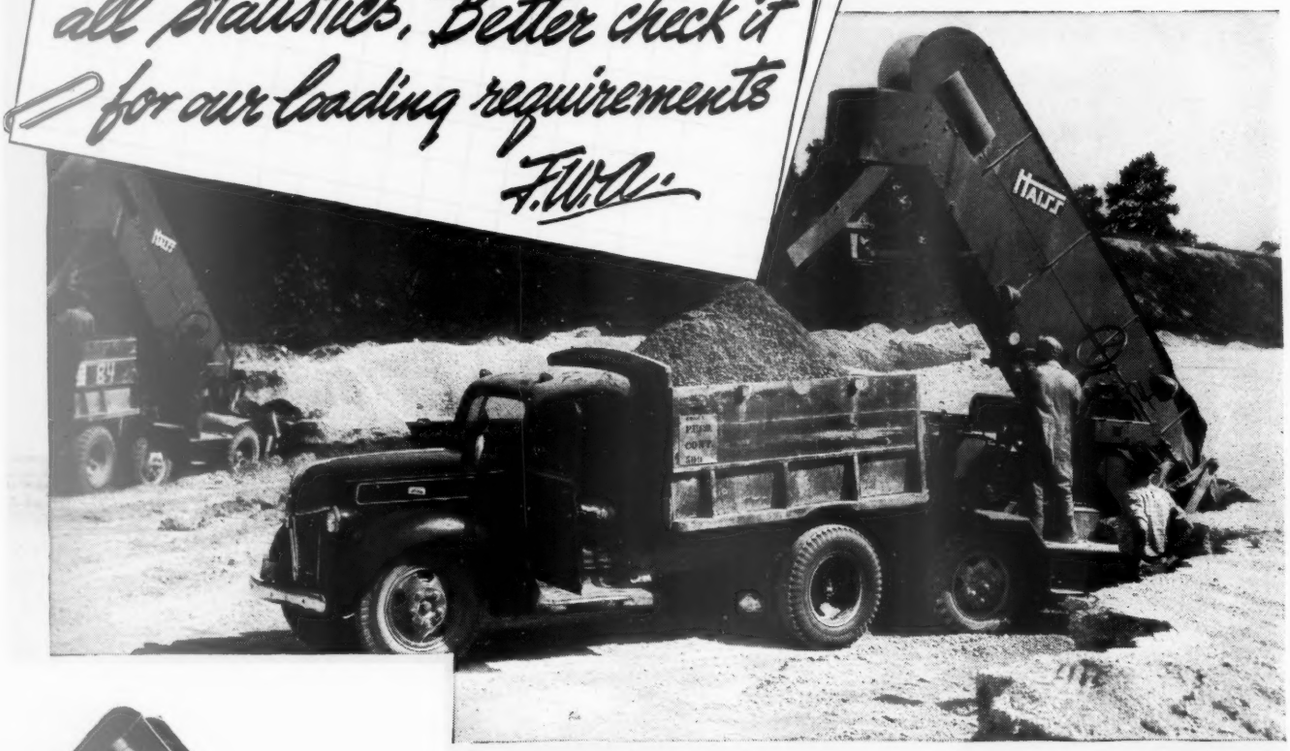
F.H.A.



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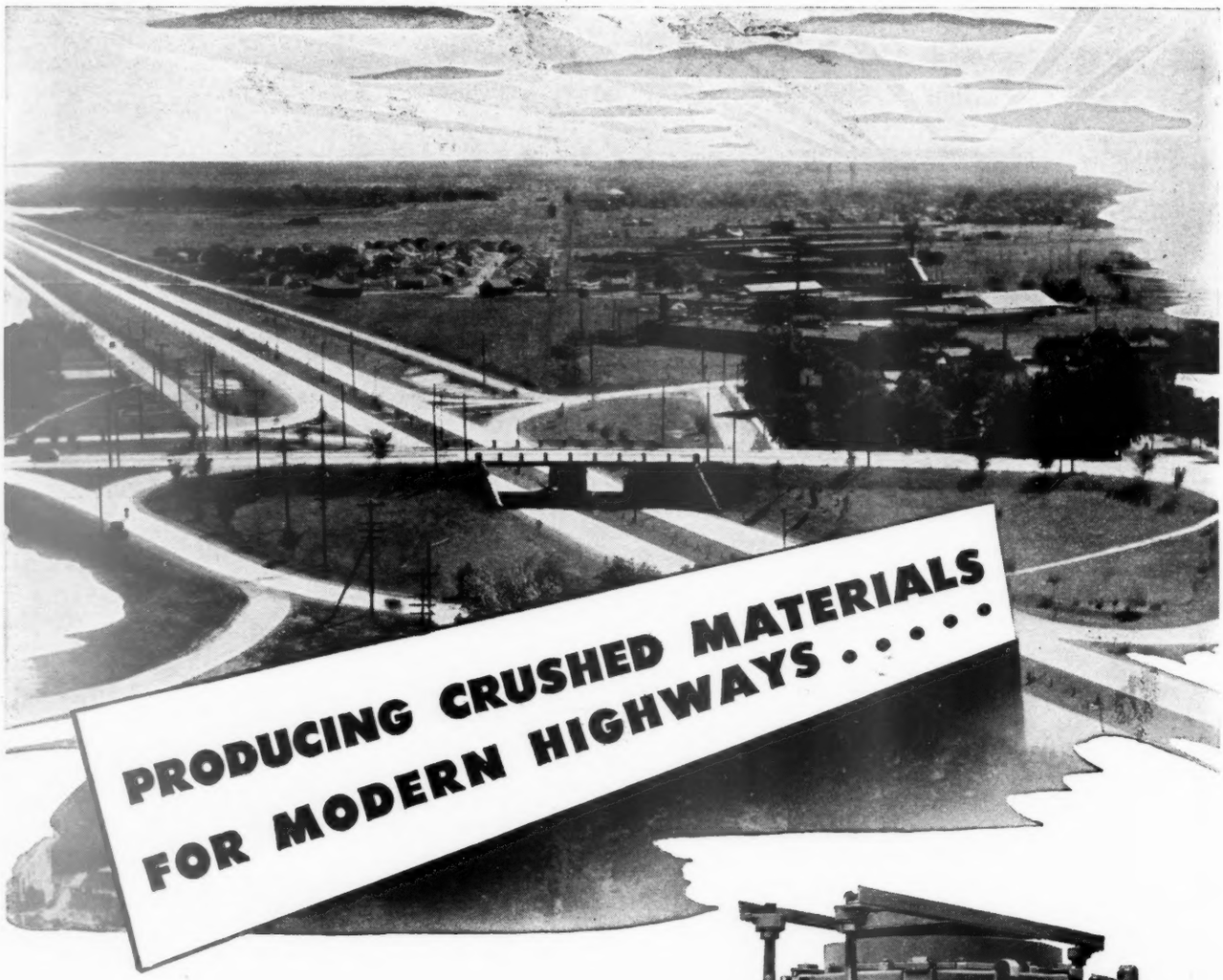
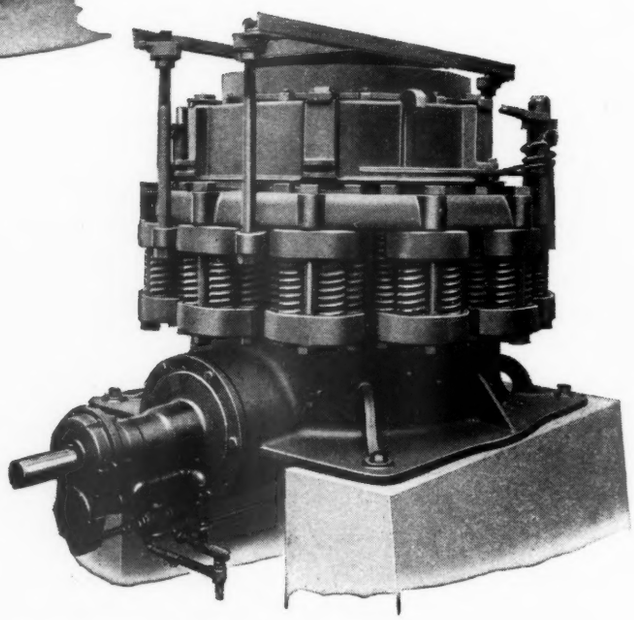


Meeting the demand for enormous quantities of proper materials required for future highway modernization programs is a problem with which many producers are faced. This is especially true in making the finer sizes of crushed stone or gravel needed for bituminous type highways for which there is a rapidly growing trend. If your plant is not equipped with a Symons Cone to make finely crushed materials in quantity and at low price, investigate the merits of this outstanding reduction crusher now used by progressive producers of stone, gravel and slag.



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SYMONS CONE CRUSHERS

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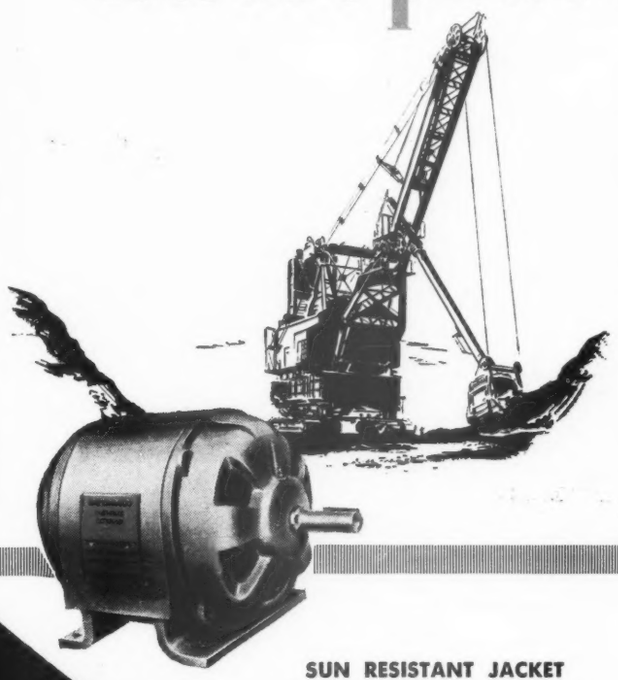
Nameplate Voltage



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*Reg. U. S. Pat. Off.

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NO LOOSE JACKETS
Special bonding process eliminates cable failures from loose jackets.

REINFORCED WEBBING
of tough Seine twine prevents tearing of jacket.

ANACONDA from mine to consumer

ANACONDA *Securityflex* **CABLE**

Your insurance against "hot" cement shipments

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DRY PULVERIZED-MATERIAL COOLER

Simple design.

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Low maintenance cost.

Internal mechanism readily accessible.

Cooling units independent of other units in same installation. One or more units may be shut down without affecting operation.

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Write for Bulletin PMC-1

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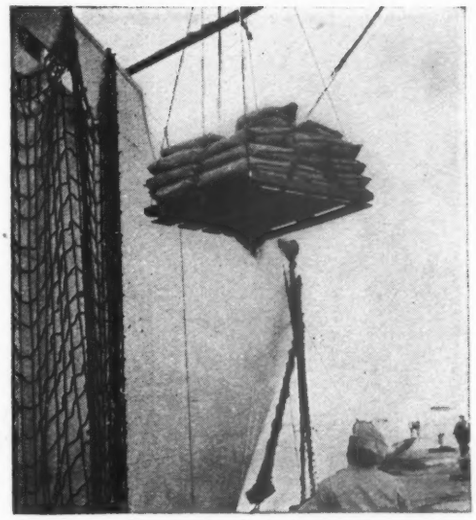
PMC-12

Remember this Ad?

...the unused cement was returned to the U. S.



Cement being unloaded from steamer returning from South Pacific. Note the excellent condition of Multiwall Paper Bags.

Multiwall Bags of cement being stacked in open after arrival in U. S., preliminary to being covered by tarpaulins.

Note the excellent condition of the Multiwall bags containing the cement. They have just returned from the South Pacific. Caking of the cement was at an absolute minimum thanks to the protection of the numerous plies of kraft paper and moisture-resistant sheets. Multiwall paper bags protected this shipment from America . . . to the South Pacific . . . and back to America again . . . additional proof that St. Regis can produce custom tailored Multiwall paper bags to meet specific requirements and to suit every condition.

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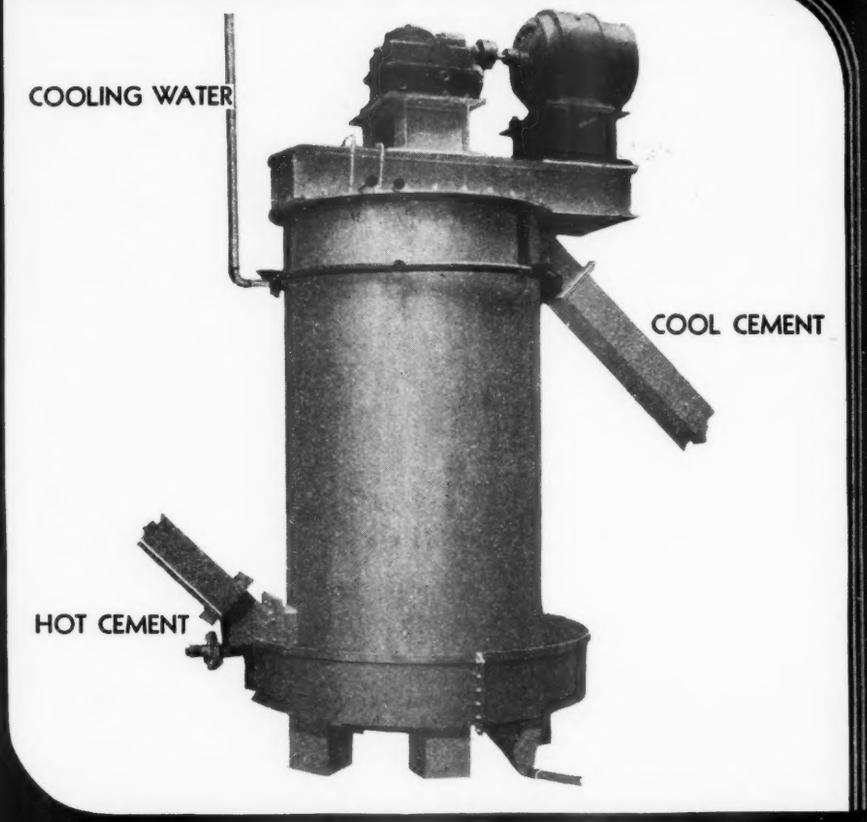
FOR COOLING HOT CEMENT



Cement manufacturers are frequently confronted with the problem of cooling hot cement to temperatures acceptable when making bulk shipments or for immediate packing in paper bags. The FLS Cement Cooler was especially developed for cooling hot cement. • The FLS Cooler consists of a tank, water-cooled externally, the cement being introduced into the bottom and conveyed in a thin layer along the inside of the water-cooled wall to the top, where it is discharged. Thus an intimate contact is established between the cement and the water-cooled surface, assuring high-cooling efficiency. • In addition to cement, the Cooler is applicable to many other similar *dry* pulverized materials.

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ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

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Change to ATLAS ROCKMASTER!

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Atlas Rockmaster is a wholly new and different kind of blasting system that has definitely cut down noise and vibration in quarries where it is in use. Reports from east, west—everywhere—say that vibration is negligible, noise is muffled, when Rockmaster is used. *Yet, these same operators say Atlas Rockmaster increases rock fragmentation—steps up shovel efficiency by 30% and more!*

"Less bark and more bite" describes Rockmaster exactly. If you want more breakage for your money—fewer complaints from your neighbors—call in the Atlas representative and have him demonstrate the Rockmaster system. Remember, Rockmaster also gives you

the greater safety of

ATLAS MANASITE DETONATORS

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Reported by Blasters

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- ✓ "ROCK BREAKAGE is decidedly more complete"
- ✓ "SECONDARY BLASTING is reduced to a minimum"
- ✓ "BACKBREAK greatly reduced"

Identify the ROCKMASTER by the Blue Color

ATLAS EXPLOSIVES

"Everything for Blasting"

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332,500
tons of Hot Mix Asphalt for the runways

... all supplied by SIMPLICITY!

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This project requires a main runway 10,000 feet long by 100 feet wide, with a 100-foot wide flanking taxiway and five connecting taxiways.

The pavements are 12 inches thick, and designed for a 300,000 lb. wheel load. The complete contract involves placement of 332,500 tons of material.

Two identical SIMPLICITY Asphalt Plants are producing an average of 2800 tons per 10-hour day.

These plants present the features that make SIMPLICITY a world-famous name in this field: efficient engineering design . . . speedy plant erection . . . simple and accurate control methods . . . large capacity . . . economical operation.

Simplicity
ASPHALT PLANTS
for Hot or Cold Mix

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THE SIMPLICITY SYSTEM CO.
CHATTANOOGA, TENNESSEE

IT'S A QUESTION OF *Capacity*

Good wire cloth must not only yield high tonnage per operating hour, but must stay on the job longer before wearing out so that shutdowns will be less frequent.

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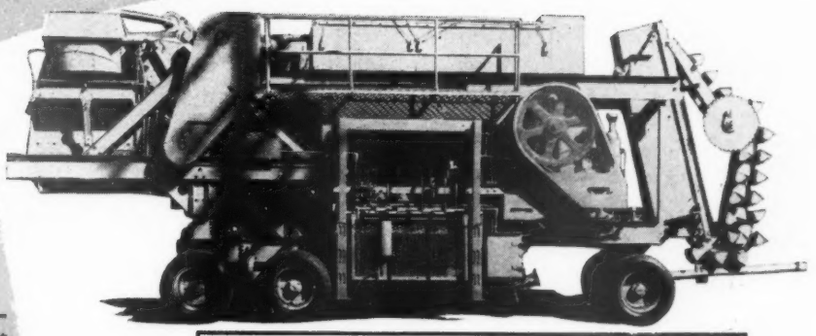
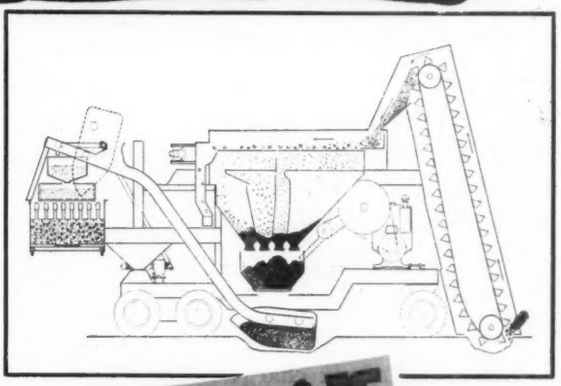
FIRST in Portability
FASTEST Set-up
FINEST Mixes

A SUPER-PORTABLE BATCH TYPE ASPHALT PLANT

—THE MODEL F





● Yes, sir—here it is—the Model F—a 2500-lb. batch type portable asphalt plant that you can set up and get into operation in a matter of minutes. The only part that has to be raised is the folding elevator. Twin-shaft, 2500-lb. capacity pug mill, 36"x10' triple-deck horizontal Cedarapids Symons screen, 4-compartment (6 batch) hopper, 25 cu. ft. batcher, 2500-lb. springless dial scale, 25 cu. ft. skip hopper, and steam-jacketed pump are in place at all times. Ground level charging hopper assures quick, easy loading. Pug mill discharges directly into trucks thereby eliminating troublesome delivery conveyor belts. Operator's platform on the ground level makes possible one-man control of all operations. Offered with a choice of gas, diesel or electric power, with or without a drier for hot or cold mixes.

The Model F is the ideal plant for paving contractors, counties, and state highway departments. It grades the aggregate, weighs the material, mixes it to suit specifications, does it better and satisfies the most rigid inspection. Get the details today.

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Cedar Rapids, Iowa, U. S. A.

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Built by IOWA

THE IOWA LINE
of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
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VIBRATOR AND REVOLVING SCREENS
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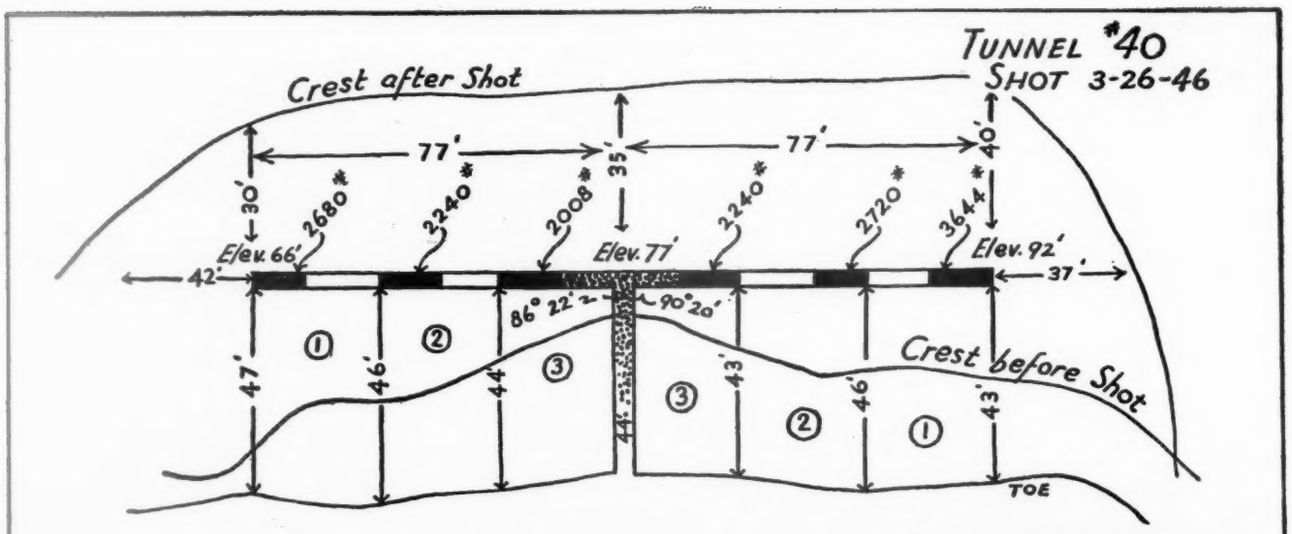
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

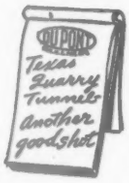


Du Pont Technical Service Representative's plan of "Nitramon" tunnel shot in Texas quarry.

TEXAS QUARRY TUNNEL SHOT

. . . another "Nitramon" success

. . . reports Du Pont Technical Service Representative



As the Du Pont Technical Service Man's field sketch shows, the adit of the quarry tunnel measured 44' with two laterals of 77' each. It was figured the shot would yield 53,230 tons and that 15,532 lbs. of "Nitramon" would be needed . . . a ratio of 3.43 T/#.

Note placement of six charges, the elevations and position of crest before and after the shot.

If your quarry presents a blasting problem . . . call upon Du Pont Technical Service Representatives. They will gladly assist in planning your shots . . . give you the benefit of their experience.

"Nitramon," the safest blasting agent, is easy to use. Though it cannot be detonated by the strongest caps, open flame, friction or impact of rifle bullets—a combination of "Primacord" and "Nitramon" Primer readily detonates it. Obtain complete information from any Du Pont Technical Service Representative.

E. I. du Pont de Nemours & Co. (Inc.)
Explosives Department
Wilmington 98, Delaware

Delivering "Nitramon" into the tunnel. Note metal wheelbarrow in use.

Partially completed units in foreground. Note completed unit.

DU PONT "NITRAMON"

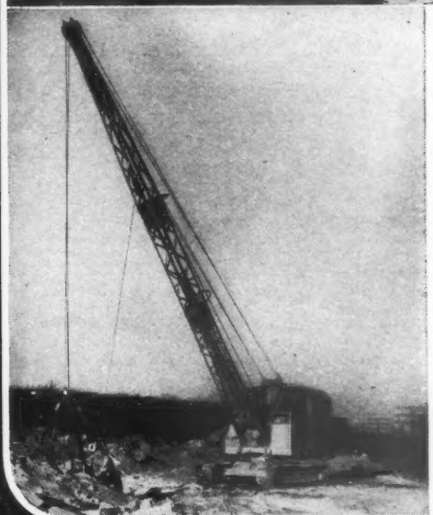
DU PONT
REG. U. S. PAT. OFF.

A Product of Du Pont Explosives Research

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Men Who Know Shovels Say-

"BUCKEYE CLIPPERS ARE TOPS' ON ANY JOB!"



OPERATORS SAY: "They're sweet jobs because they handle so easily!"

Their long, wide crawlers and correct balance provide easy maneuverability. Positive chain crowd moves any load. "Mevac" metered vacuum power control, gives instant, smooth response—"real feel."

MECHANICS SAY: "We know very little about Buckeye Clippers. They must be rugged, because they're so seldom down for repairs."

Right! Clippers have the in-built stamina to "stand the gaff" on the toughest work. Every part and material—clutches, brakes, bearings—is tested to assure plenty of capacity. All components easy to get at.

OWNERS SAY: "They cut costs to the bone! They're wizards at turning out big yardages at lower overall costs."

Buckeye better engineering and fast, efficient "Mevac" control permits Clippers to clip time off the operating cycle. Gasoline, diesel or electric powered Clippers increase yardages—cut costs.

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- √ Completely Convertible
- √ "Mevac" Vacuum Power Control
- √ Rugged Construction—Low Cost Operation

Check the performance of Buckeye Clippers for low cost material handling, stripping and excavation.

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FINDLAY, OHIO

built by **Buckeye**

CONVERTIBLE SHOVELS—BULLDOZERS—ROAD WIDENERS
TRENCHERS—MATERIAL SPREADERS—R-B FINEGRADERS

PIT AND QUARRY

June, 1946

Vol. 38 No. 12

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IT S-T-R-E-T-C-H-E-S

THE LIFE OF YOUR EQUIPMENT

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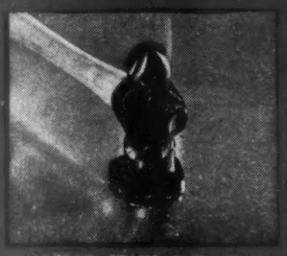
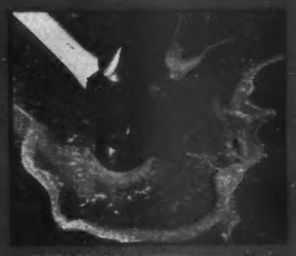
GREASE SEPARATES. Ordinary grease is not cohesive, has no stretch. It permits entrance of dirt and moisture — fails to protect parts.



MARFAK STAYS PUT. Hit it as hard as you can, Marfak cushions the blow, doesn't splatter — stays in the chassis bearings.



GREASE SPLATTERS. Hit ordinary chassis lubricant and it flies in all directions — leaving parts unprotected.

THIS unique "stretch test" is convincing proof that *Texaco Marfak* has amazing ability to *hold together*. That means it stays where you put it. It won't squeeze out under heavy loads, won't jar out under the hammering of rough service. It also seals out dirt and moisture, protects parts longer.

Contractors everywhere find that *Marfak* gives greater protection with fewer applications. *Marfak*-protected machinery stays on the job longer. Fewer repairs and parts replacements are necessary. Maintenance costs are reduced.

To prolong the life of wheel bearings, use *Texaco Marfak Heavy Duty*. It forms a protective film inside the bearing, while retaining its original consistency at the outer edges — thus sealing itself in, sealing out dirt and moisture. It gives longer-lasting protection. Requires no seasonal repacking.

More than 200 million pounds of Marfak have been used to date!

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT STARRING JAMES MELTON WITH HIS GUEST, ED WYNN — CBS

EDITORIAL

Responsibilty for the Coal Strike

IF the statements of radio commentators, newspaper editorial writers and the persons one meets in everyday life are representative of the attitude of most people toward the coal strike, then it is not too much to say that public opinion, on this as on so many other subjects, borders on the psychopathic. Many of the diagnostic symptoms are there: emotional instability, abnormal suspiciousness, and a lack of common sense, self-control and social feeling. The outbreak of emotionalism, apparent on every side, is wild enough to be characterized as hysterical, and the suggestions for remedying the situation proposed by persons in different walks of life exhibit a resentment and spirit of retaliation that are reminiscent of the eye-for-an-eye philosophy of the Middle Ages.

Few people know or care anything about the historical background of the strike or the reasonableness of the miners' demands, or recognize the inevitability of Mr. Lewis' success in this as in previous strikes and the folly of attempting to correct a fundamentally unsound and unjust situation by legislation born of public exasperation and fury. All that appears to concern most people is the inconvenience they suffer as the results of idle elevators, closed theaters, candle-lighted night clubs, half-normal shopping hours, and the like.

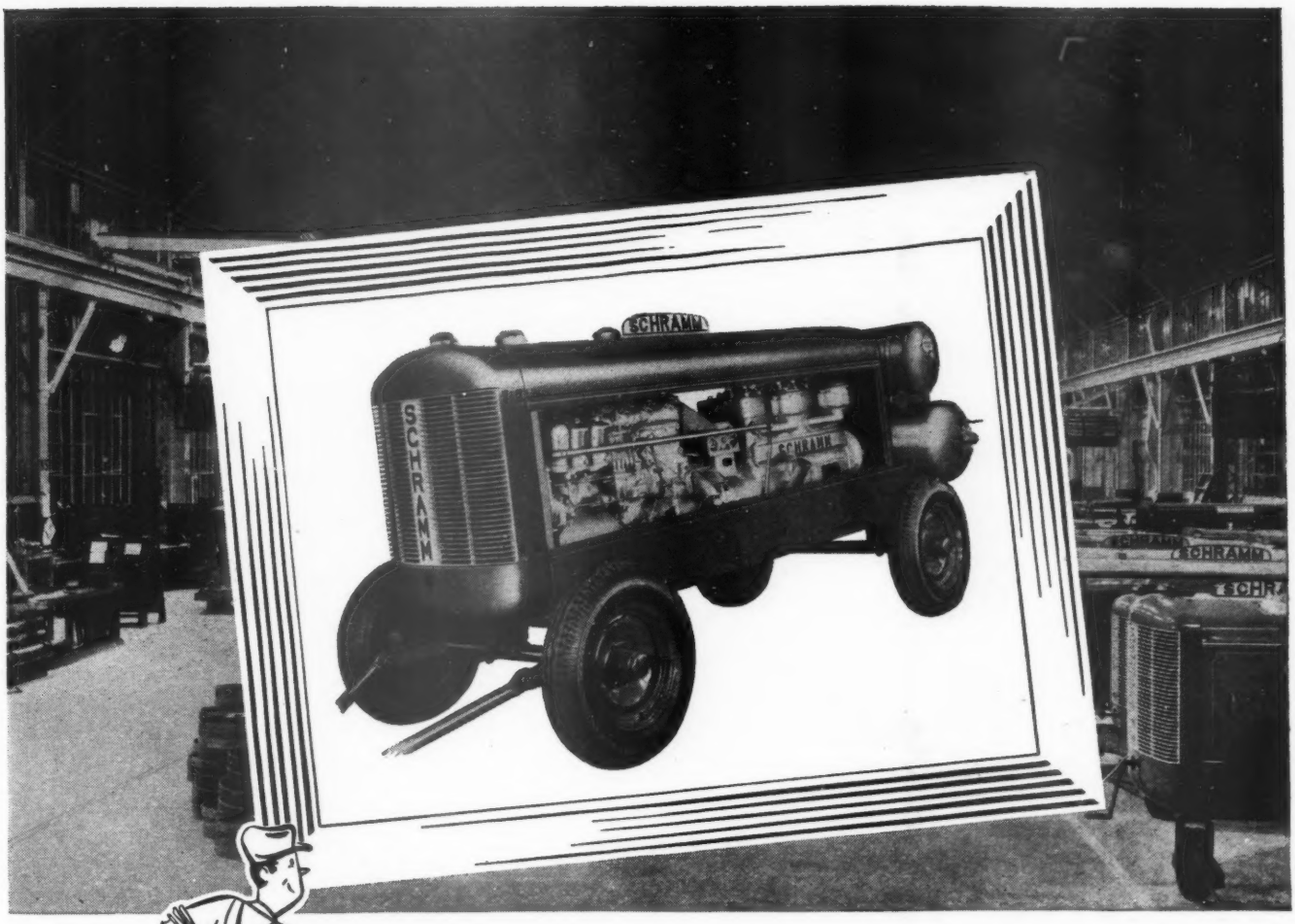
"No single man should have the power over the nation's economic life wielded by John L. Lewis," say the editorial writers. "No minority should be able to cripple the business and social life of an entire country," say the letters to the editors. "The government should seize the mines and operate them in the interest of the American people," cry others. "Congress must immediately outlaw strikes"; "the President ought to crack down and make it hurt"; and so on. And, "How do you like it, Americans?" asks the publisher of a chain of newspapers in an appeal to his already overexcited and misguided readers.

Viewed objectively, all this is a form of madness, a calling-for-mama, a theatrical stamping and screaming rage, unworthy of a people that considers itself mature, intelligent, shrewd and well-educated. If we were mature, we would not indulge in childish bawling. If we were intelligent, we would know that Mr. Lewis is the product of circumstances and conditions for which we all are largely responsible. If we were shrewd, we would know that it is easier to prevent than to cure. And, if we were well-educated, we would know more about the underlying evils of the coal-mining industry, more about the hazards of the coal miners' occupation, and more about the indifference of mine owners and legislators to the conditions that prevail in the mines, than can be learned by reading only newspapers and "popular" magazines.

Except for logging, the mining of coal is the most dangerous of all industries; its accident-frequency rate is the second highest. The toll it exacts in deaths and crippling injuries is appalling. The record of this industry, in its disregard of the value of human life and in its lack of interest in the welfare of its workers and their dependents, is a disgrace to right-thinking people; it is a blot on the American industrial scene. If it were not so, neither John L. Lewis nor any other man could hold in his hands perfect control over the habits, thoughts and destinies of 400,000 men. Mr. Lewis did not earn among Senators the sobriquets, "scoundrel", "labor bully", and "traitor", because he is those things, but rather because the American people, through their easygoing indifference and lack of concern for "other people's" problems, have encouraged the growth of the dissatisfaction and discontent on which he has been able to build and maintain an aggressive and self-centered unionism. If, in times of relative industrial tranquillity, we of the general public show no interest in minimizing the dangers of coal-mining, or in the adequacy of miners' wages, or in the conditions in which miners work, have we reason to be astonished or angry if, in a time of industrial crisis, the miners show no interest in whether we climb stairs or ride in elevators, in whether we sit at home or in the theater, in whether we lean on our favorite bar in the faintness of kerosene lamplight or the brilliance of electric illumination, or in whether we do our shopping within four instead of eight hours?

IT is natural to seek a scapegoat on whom the blame for all our troubles can be fixed, but it is not easy to find one, especially in the coal industry, because responsibility for the "catastrophe" and "industrial paralysis" which the strike brought upon us can not rightfully be placed on any one person or group. The fault is not solely Mr. Lewis', because he would be as lacking in power as any other single American, if he did not have the growing discontent of nearly half a million men from which to draw his bargaining and maneuvering strength. He would not dare to risk the security and welfare of his union's members—to say nothing of his own—if he did not know that he could count on the selfish indifference of most people when all goes well and on their cringing fear when they find themselves in danger. He is staking everything on his firm belief that the public will force concessions from the mine owners or that the cupidity of some owners will lead them to break the "solid front" of opposition to the miners' demands which they now present.

It is high time that we all recognize and assume our individual share of the responsibility for present conditions in the coal industry—a situation that makes recurrent strikes not only possible but inevitable. We can do that only if we set out to learn what is wrong with the industry at the worker level and then apply the pressure of public opinion where it can serve as a preventive instead of remaining aloof until the lightning hits and then grasping at makeshift and impractical remedies. "King Coal" may easily become and remain "Tyrant Coal", unless the American people as a whole can be brought to see their individual and collective responsibility and do something sensible and practical to prevent it.



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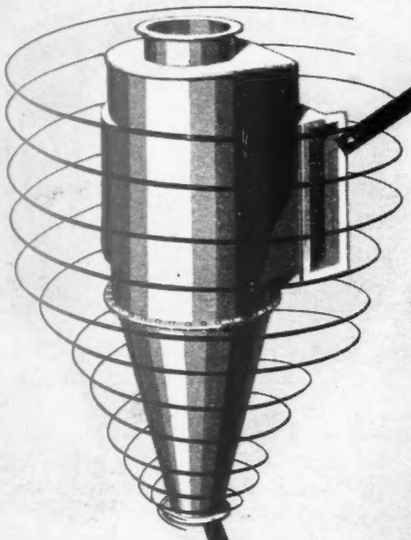

Buell Fly Ash Collectors, employing exclusively the well-known van Tongeren System of dust collection, are internationally known throughout industry for "High efficiency, Low maintenance, Long life." Among their outstanding qualities and performance characteristics are: (1) high efficiency mechanical flue dust collection to meet the specific requirements of any job, (2) ready adaptability to any existing duct work, (3) low initial cost, (4) low maintenance and operating cost, (5) power consumption as low as 1 H. P. per 20,000 pounds of gas per hour. Buell's Bulletin, illustrated above, explains in chart and illustration the Buell (van Tongeren) principle of industrial dust recovery.

Every operating executive and engineer will find it most helpful in the selection of dust recovery equipment for his particular requirements.

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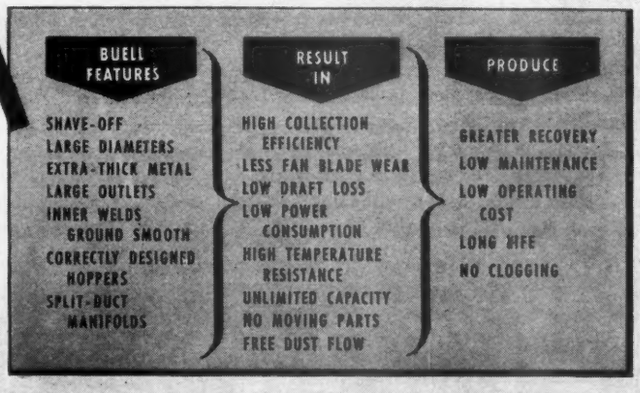


BUELL ENGINEERING COMPANY, INC., 12 Cedar Street, Suite 5000, New York 5, N.Y. *Sales Representatives in Principal Cities*

John Lawson Senior, Cement Industrialist, Dies in New York

John Lawson Senior, chairman of the Board of Directors of the Consolidated Cement Corp., and president of the Florida, the Signal Mountain and the Trinity Portland Cement companies and of the Cowham Engineering Co., died at a New York hospital on April 29. Mr. Senior was born in Montgomery, Orange County, New York, on March 31, 1879.

After having been engaged in the practice of law Mr. Senior became president

John Lawson Senior

of the Peninsular Portland Cement Co. Subsequently he organized and headed the staff of the Cowham Engineering Co., which specializes in cement plant management, construction and design. When in 1926 the Peninsular Portland Cement Co. was merged with the Great Western Portland Cement Co. of Mildred, Kan., and the Fredonia Portland Cement Co. of Fredonia, Kan., to form the Consolidated Cement Corp., Mr. Senior was named president and later chairman of the directors' board.

He was a member of the executive committee of the Portland Cement Association in 1928 and of the board of directors in 1929 and 1930. He also served on the committees on statistics, advertising-and-publicity and accounting. In 1943 he was made an honorary member of the association in recognition of his long period of service to the cement industry.

Triple Protest Registered Against Freight Increase

The National Crushed Stone Association, joined by the National Sand & Gravel Association and the National Slag Association, has recorded a protest against the proposed increase requested of the Interstate Commerce Commission by Class I railroads on freight charges for shipments of crushed stone, sand and gravel and furnace slag. The proceedings have been docketed by the I.C.C. as Ex Parte 162. The carriers ask an increase of 20 cents per net ton. They also seek I.C.C. approval of an increase of 30 cents per ton on shipments of fluxing stone and raw dolomite.

Ideal Cement Co. Buys War Plant at Mobile

Through a transaction involving the sale of an aluminum plant at Mobile, Ala., to the Ideal Cement Co. of Denver for $1,500,000, the latter has acquired facilities for the production of 1,000,000 barrels of cement per year at Mobile. The deal was approved by the War Assets Corporation. During the war the Defense Plant Corp. operated the factory.

Coming Events

June 24-28, 1946 — *Buffalo.* Annual meeting, American Society for Testing Materials and exhibit of testing apparatus and related equipment.

July 17-20, 1946—*Spokane.* Summer convention, American Society of Civil Engineers. Davenport Hotel.

September 16-18, 1946—*New York.* 75th anniversary meeting, American Institute of Mining and Metallurgical Engineers, Waldorf-Astoria Hotel.

October 7, 1946—*Chicago.* 34th National Safety Congress and exposition, Stevens Hotel.

F.W.A. Reports Bids Received for 576 Road Projects in 1st Quarter

State highway departments and the District of Columbia received bids during the first three months of the year for 576 Federal-aid road projects, according to reports from field offices of the Public Roads Administration of the Federal Works Agency. The total amount for low bids submitted was $104,212,176. The list included one project in Puerto Rico.

Contracts were awarded in the three-month period for 413 projects at a construction cost of $71,803,075; but 124 bids involving expenditures of $21,096,040 were rejected by the state highway departments because of the extent to which they exceeded estimated costs. Bid rejections by the states represented approximately 20 per cent. of the total volume of work on which bids were taken.

Under a recent ruling, field engineers of the Public Roads Administration are required to withhold approval and submit to the Washington office for review all low bids that are 50 per cent. above the cost of similar Federal-aid road construction undertaken in 1940.

During the first quarter of this year 1,087 contracts were awarded for Federal, Federal-aid and state supervised non-Federal-aid projects, at a total cost of $94,089,833. The figures include a small amount of work on National Forest roads, for which contracts were awarded by the Federal Government.

State highway construction programs under funds authorized for the first post-war fiscal year, approved by the Public Roads Administration as of April 6, call for expenditures estimated at $389,445,000. On that date the Public Roads Administration had approved detailed plans for highway projects financed with post-war funds estimated to cost $152,031,000.

Thyrre Named Official of Natl. Portland Cement Co.

In the recent election of the National Portland Cement Co. of Philadelphia, Sven G. Thyrre was named executive vice-president. Mr. Thyrre, who is vice-president of F. L. Smidth & Co. of New York City, will continue his duties with this firm. The Smidth company is well known for its cement-making machinery and factories.

A.S.T.M. to Occupy New Permanent Headquarters In Its Own Building

The American Society for Testing Materials, which for a number of years has had its headquarters at 260 S. Broad St., Philadelphia, has acquired permanent headquarters at 1916 Race St. in Philadelphia. This building, which was purchased and remodeled through contributions made by many of the companies and individuals active in the Society's work, will provide the much-needed additional space required by the expansion of the Society's staff. The technical work in which A.S.T.M. since 1898 has concentrated its activities, namely, the development of standard specifications and tests for materials and the promotion of knowledge of properties of materials through research, has necessitated a considerable expansion of the headquarters group.

While the alterations to the building will not be fully completed until early summer, sufficient progress has been made so that the staff can vacate its old quarters.

Summer A.S.C.E. Convention To Be Held at Spokane

Spokane has been chosen as the host city for the 1946 summer convention of the American Society of Civil Engineers, according to an announcement made by Col. William N. Carey, secretary and executive officer. About 500 members of the 93-year-old organization are expected to assemble in Spokane from July 17-20 at the Davenport Hotel. Nine technical sessions, featuring irrigation, power, hydraulics and other civil engineering projects, will be held.

W. W. Horner, St. Louis consulting engineer, the national president, will make the address at the opening session. Arrangements are in charge of Harold J. Doolittle, president of the local section, and William D. Shannon, A.S.C.E. director for the district.

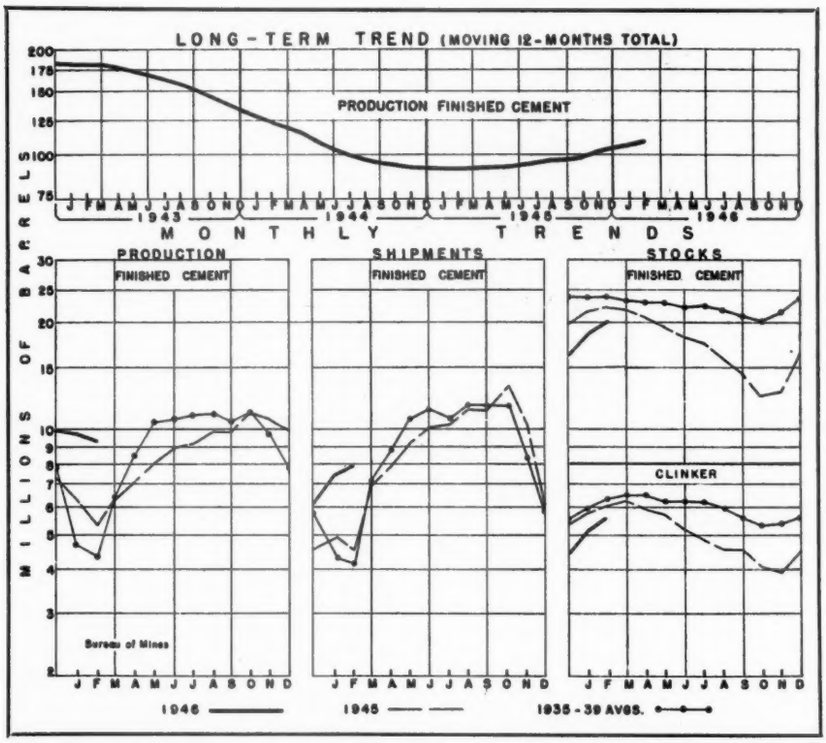
Penn State, D.I.M.A. Map Diesel Engineers' Course

The School of Engineering of the Pennsylvania State College, in cooperation with the Diesel Engine Manufacturers Association will offer a short course for college teachers of diesel engineering from June 24 to July 6 at State College, Pa.

The purpose of the course, according to H. P. Hammond, dean of the School of Engineering at Penn State, is to bring about a better understanding of the function of engineering schools in preparing students to enter the diesel industry and to aid in improving the standards of class instruction and laboratory work.

Leading engineers from the Diesel Engine Manufacturing and Research Laboratories and faculty members of the School of Engineering at Penn State will be the instructors.

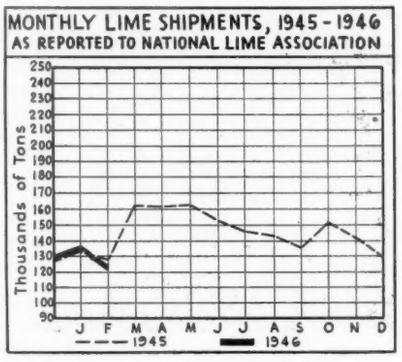
Among the speakers on the program are: Glenn C. Boyer, associate engineer, Burns and McDonnell Engineering Co.; R. L. Boyer, chief engineer, the Cooper-Bessemer Corp.; L. J. Bradford, professor of mechanical engineering, and K. J. DeJuhasz, professor of engineering research, both of Pennsylvania State College; Harvey T. Hill, executive director, Diesel Engine Manufacturers Association; and W. M. Holaday, director, research department, Socony-Vacuum Laboratories.



Production of 9,250,000 barrels of cement in February, 1946, reported to the U. S. Bureau of Mines, was 72 per cent. greater than that reported for February, 1945. This remarkable gain reflects the increasing demands for cement as the construction industries revive. Shipments of 7,853,000 barrels were also 72 per cent. above those reported for the corresponding month of the previous year. Mill stocks on February 28, although 10 per cent. lower than at the end of February, 1945, were considerably larger than at the end of January, 1946. Clinker production of 9,749,000 barrels in February, 1946, was 72 per cent. above that reported for February, 1945. The industry operated at 50 per cent. of capacity in February, 1946, whereas a year earlier it was operating at only 29 per cent. of capacity. Cumulative figures for the first two months of 1946 show a gain of 61 per cent. in both production and shipments, and a gain of 63 per cent. in clinker production, as compared with the similar period of 1945. Demand for cement, as indicated by mill shipments, was higher than in February, 1945, in all districts. The largest gains were recorded for New York, Maine, Ohio, and Kansas. The long-term trend in production of finished cement is indicated in the accompanying chart. Trends in production, shipments and stocks are also indicated graphically compared with the 1935-39 average.

Rise in Construction Greatest in History

The *Monthly Report on Civilian Production* for April, 1946, revealed that construction in the United States is making more than seven-league strides, despite materials shortages. According to the report: "The rise in activity from $524,000,000 in February to $612,000,000 in March was the largest ever recorded for the industry in relative or in absolute terms. Residential construction continues to pace the advance. . . . The number of new dwelling units started so far this year shows . . . an average of 42,000 for January and February as compared with a monthly average of 75,000 for the peak of the twenties."



According to data collected by the National Lime Association, 48 companies in February, 1946, shipped 122,910 tons of lime (67,659 quicklime; 55,251 hydrate). Reporting companies represent 42.8 per cent. of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 316,000 tons. Shipments of lime by users for February, 1946, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	1,218	13,266
Building	8,082	20,705
Chemical	58,359	21,280
Total	67,659	55,251

Wyatt Issues Order Aiding Veterans to Build Low-Cost Homes

Wilson W. Wyatt, National Housing Expediter, has issued a National Housing Agency General Order which is to be the first step toward channeling building materials into moderate and low-cost housing under the Veterans' Emergency Housing Program.

The order apportions certain definite percentages of new housing construction into rental units and low-cost homes, making allowances for geographical differences in construction costs. It further determines the maximum costs in each bracket through a "dividing line" technique which is based on local builders' construction estimates for the first quarter of this year. Established "dividing lines" shall not exceed $60 per month on rentals or $7,500 for a purchase, unless submitted to the Washington office of the F.H.A. for approval.

Mr. Wyatt explained that under this channeling order, 25 per cent. of the new housing units must be rented. If one-third of the rental units built in the first quarter of 1946 were below $50, then 50 per cent. of the new rental units must rent below that figure. If the purchase "dividing line" for a particular locality is $6,500, then 50 per cent. of all new sale units must sell for less than $6,500. The order also specifies that applications submitted by veterans for construction of their own homes under Priorities Regulation 33 shall receive first preference in the order of processing; building costs in this case shall not exceed $10,000.

In commenting on the "dividing line" determination, Mr. Wyatt gave the following approximate figures based on reports for the first quarter: New Orleans, $4,500; Atlanta, Louisville, Fort Worth, $5,500; Denver, Seattle, $6,000; Indianapolis and Kansas City, $6,500; Los Angeles and Milwaukee, $7,000; Philadelphia, Providence, and Boston, $7,500; Pittsburgh, $8,000; Washington and Chicago, $8,500; New York, $9,000. Mr. Wyatt stressed the fact that any "dividing line" over $7,500 probably will be reduced. The rental "dividing line" for the same localities ranged from $40 a month in the lower construction cost cities to $65 in New York City.

Civil Engineers Discuss U. S. Public Work Projects

The annual spring meeting of the American Society of Civil Engineers was held April 17-19, in the Bellevue-Stratford Hotel, Philadelphia, Pa., with approximately 1,000 civil engineers in attendance.

Many of the speakers on the program were engineers engaged in various public works programs. Dr. Arthur Casagrande, associate professor of civil engineering at Harvard University, discussed his work in developing a mathematical formula applicable to sub-surface water drainage problems, as encountered in airport runway construction. William L. Shannon, engineer in the U. S. Engineers office in Boston, reported that he had been checking Dr. Casagrande's formulae in tests with models.

Others participating in the program spoke of the natural elements and economic considerations to be dealt with in carrying out proposed construction and improvement programs. Representative Carl Hinshaw of Pasadena, Calif. the only member of the Congress in the Society, stated that legislation favorable to advancing sound public works programs could be dealt with best by men who have been engaged in this type of work. He therefore urged the engineers to give the public the benefit of their training and experience by seeking public office and taking an active part in the affairs of the country.

To mark the installation of a third kiln by the Calaveras Cement Co. at San Andreas, Calif., a barbecue was held and appropriate ceremonies were conducted. The kiln is 360 feet long and has a capacity of 3,500 barrels of cement daily.

Soft Coal Walkout And Rail Embargo Affects Eastern Plants

The coal shortage resulting from the current U.M.W. strike has hit the cement-making industry in the East, where the Pennsylvania Dixie Cement Corp. closed one plant and contemplates closing a second. Linked with the lack of soft coal for fuel is the present embargo on freight shipments, which prevent packing operations and shipments and which may affect the delivery of gypsum, an essential material used in the production of Portland cement.

Other cement firms throughout this area affected by the strike include the Alpha Portland Cement Co., the Hercules Cement Co., the Lone Star Cement Corp. (Pennsylvania Division), the Lehigh Portland Cement Co., the Keystone Portland Cement Co., the Universal Atlas Cement Co. and the Lawrence Portland Cement Co.

Revision of Specifications for Cement and Concrete Approved at A. S. T. M. Meeting

At the annual spring meeting of the American Society for Testing Materials, held in Pittsburgh, Pa., Committee C-1 on Cement approved the following three recommendations affecting standards:

To revise the Standard Specifications for Portland Cement (C150-44) by adding to Table 1 on chemical requirements, a footnote providing that the maximum limit for sulphur trioxide content for Types 1 and 3 cements be 2½ and 3 per cent. respectively, when the tricalcium aluminate content is greater than 8 per cent.

To revise the Tentative Specifications for Air-Entraining Cement (C175-44T) by adding a footnote to Table 1 providing that the maximum limit for sulphur trioxide content for Type 1A cement be 2½ per cent. when the tricalcium aluminate content is greater than 8 per cent.

To adopt as standard sections 2 to 10 inclusive of the Tentative Methods of Chemical Analysis of Portland Cement (C114-44T). These sections include a rapid alternate method for sodium oxide and potassium oxide, a method for sulphide sulphur, and the alternate method of rapid determination by turbidimeter for sulphur trioxide.

Progress reports were given by the various sub-committees. One report covered data obtained by the investigation of compressive-strength test of mortars. Summaries of work on the use of the lean mortar bar test for sulphate resistance, and the effects of alkalies in Portland cement on the durability of concrete were also given. William Lerch, of the Portland Cement Association, presented an illustrated talk on "The Effect of Sulphur Trioxide Content of Cement on the Durability of Concrete."

Committee C-9 on concrete and concrete aggregates announced its plans for a symposium on durability of concrete, to be held during the A.S.T.M. meeting in Buffalo, N. Y., on June 24. W. F. Kellermann, of the Federal Public Roads Administration, is chairman of the group. Serving with him are: R. E. Davis, University of California; Floyd B. Hornibrook, Master Builders Research Laboratories; and K. B. Woods, Purdue University.

Two new sub-committees are being organized to investigate methods of testing and to develop specifications, one on admixtures in concrete and the second on the reactivity of aggregates with alkalies.

The committee will develop, jointly with A.S.T.M. Committee C1 on cement, a definition for admixtures. It is studying revisions in the definitions for sand, with the following proposal considered: Sand—the fine granular material, usually smaller than ¼ inch, resulting from the erosion of rock by natural agencies or from the mechanical reduction of weakly cemented sandstone. The term is often used with a qualifying adjective to denote the product of mechanical crushing, as for example, "stone sand" or "slag sand."

Several new studies are to be inaugurated in the general field of methods and apparatus for testing concrete. One of these will involve the thermal coefficient of aggregates, which property bears a very tangible relation to the durability of concrete, and in general affects the quality and use of the product. Changes are also being incorporated in the slump and flow tests, C143 and C124.

In the work on aggregates, it is anticipated that major revisions will be developed in the soundness test. A new project will involve the identification of aggregate types. It was also announced that a complete study is being made of specifications, developed by Committee C-9, covering ready-mixed concrete, C94.

Southern Alkali Leases Facilities in Louisiana To Make Soda, Chlorine

It was revealed by Harold F. Pitcairn, president of the Southern Alkali Corp. that the firm had leased a major portion of a government-owned plant at Lake Charles, La. Southern Alkali is owned jointly by the Pittsburgh Plate Glass Co. and the American Cyanamid Co. The leased plant will be used for the production of caustic soda and liquid chlorine.

An extensive remodeling project, estimated to require a year, is under way. When the alterations have been completed, a long-term lease will begin.

Stanley J. Hultman, who was formerly superintendent of the Southern Alkali plant at Corpus Christi, Tex., was appointed plant superintendent of the Lake Charles unit.

261 Awards Presented By Holmes Association

For risking their lives to save others and for displaying courage and resourcefulness in emergencies, 35 workers in the mineral and allied industries throughout the United States and Alaska have been awarded bronze medals or displomas by the Joseph A. Holmes Safety Association, according to a U. S. Bureau of Mines bulletin. Certificates of honor also were awarded to 162 mining companies for operating over long periods with few or no accidents, and to 64 individual workers and supervisors for excellent long-time safety records. The awards cover the five years from 1941 to the present, since the association suspended its activities during the war.

Founded in 1916, the Joseph A. Holmes Safety Association is made up of 29 leading national organizations representing the mining, metallurgical and allied industries. It commemorates the efforts of Dr. Joseph Austin Holmes, first director of the Bureau of Mines, to reduce accidents and ill health in these industries, and its chief activity is the annual awarding of medals and certificates for heroic conduct and good safety records.

The association also voted a special award, consisting of a certificate of merit and a bronze medal, to Dr. George S. Rice, for 25 years chief engineer in charge of the health and safety work of the Bureau of Mines, and one of the nation's outstanding authorities on mine safety. Dr. Rice retired from active service about nine years ago.

Certificates of honor for extraordinary achievements in safety were awarded to the following:

Dolonah quarry, Tennessee Coal, Iron & Railroad Co., Bessemer, Ala.; Monarch quarry, The Colorado Fuel & Iron Co., Garfield, Colo; Plant No. 2, limestone quarry, Pennsylvania-Dixie Cement Corp., Clinchfield, Ga.; quarry, National Gypsum Co., National City, Mich.; cement plant and quarry, Ash Grove Lime & Portland Cement Co., Louisville, Neb.; White Haven sandstone quarry, General Crushed Stone Co., White Haven, Pa.; Alabama Asphaltic Limestone Co., Margerum, Ala.; Wagon Wheel Gap fluorspar mine, The Colorado Fuel & Iron Co., Wagon Wheel Gap, Colo.; Certain-Teed Products Corp., Grand Rapids, Mich.; Duluth plant, Universal Atlas Cement Co., Morgan Park, Duluth, Minn.; Permanente quarry, Permanente Cement Co., Permanente, Calif.; Plant No. 5, The Carey Salt Co., Lyons, Kan.

The Canada Cement Co., Ltd., of Montreal, Canada, will begin construction of storage silos at its cement plant at Pointe Anne, near Belleville, Ont. The silos will be 275 ft. by 100 ft. by 100 ft. The estimated cost is $470,000.

Manpower Shortage Slows $10,000,000 Program of Road Work in Pennsylvania

According to reports from Harrisburg, the lack of manpower is delaying work on Pennsylvania's $10,000,000 farm-to-market road program. Since last fall, when the program was announced by Governor Edward Martin, work has begun on only a few sections. Contractors indicated unwillingness to take on long-range jobs because of the uncertainty of materials costs.

Ray F. Smock, state highways secretary, stated that rural roads projects financed wholly by the state would have priority over Federal-aid jobs.

O. P. A. PRICE INCREASES IN BUILDING MATERIALS SINCE V-E DAY

Item	Increase	Level	Area	Regulation	Date
Building, chemical and industrial lime (except agricultural lime)	65 cents per net ton	Producer	8 Southeastern states	Amdt. 77 Order A-1 MPR 188	5/12/45
Building, chemical and industrial lime (except agricultural lime)	75 cents per ton over 1942 level	Producer	Ark., Kan., Neb., Okla., Western Mo.	Amdt. 82 Order A-1 MPR 188	6/21/45
Gypsum lath	Actual freight, charge from Plasterco, Va., to:	Manufacturer, reseller	Fla., Ala., Ga., S. C., parts of N. C.	Amd. 85 Order A-1 MPR 188	7/7/45 (effective to 12/31/45)
Gypsum lath	Actual freight charge from Calif., Nev., Mont., to:	Manufacturer, reseller	Ore., Wash.	Amdt. 86 Order A-1 MPR 188	7/13/45
Building, chemical and industrial lime (except agricultural lime)	$1.20 per ton from N. Eng. and Eastern N. Y.	Producer		Amdt. 1 Order 1 MPR 592	8/13/45
Concrete Blocks	½ cent per Unit	Producer	Dade County, Fla.	Amdt. 2 Order 1 MPR 592	8/20/45
Gypsum lath, liner board	$4.25 per M. sq. ft.	Producer	Eastern seaboard	Amdt. 3	8/21/45
Gypsum lath, liner board	2½ cents per sq. ft.		Calif., Nev.	Amdt. 4 Order 1 MPR 592	
Cement	10 cents per bbl.	Manufacturer	Ohio, Mich., W. Va., parts of Pa., Va., Ky.	Amdt. 11 MPR	9/5/45
Calcined gypsum plaster	$2.40 per ton	Manufacturer, reseller	Eastern seaboard	Amdt. 7 Order 1 MPR 592	9/14/45
Building, chemical and industrial lime (except agricultural lime)	$ & ¢ increase	Jobbers, wholesalers, agents		Amdt. 10 Order 1 MPR 592	10/4/45
Ready-mixed concrete	$ & ¢ increase Port. cement	Manufacturer	Ohio, Mich., W. Va., Western Pa., Ky.	Amdt. 13 Order 1 MPR 592	10/30/45
Portland cement	10 cents per bbl.	Producer	South	Amdt. 12 MPR 224	11/10/45
Ready-mixed concrete	$ & ¢ increase Port. cement	Manufacturer	Ga., Ala., Tenn., La., Miss., N. C., S. C., Fla., parts Va.	Amdt. 15 Order 1 MPR 592	11/15/45
Gypsum lath, liner board, plaster	$3 per M. sq. ft.	Manufacturer, reseller	Except Calif., Nev.	Amdt. 17 Order 1 MPR 592	11/16/45
Calcined gypsum plaster	$2.40 per ton		5 Eastern mills, 2 Va. mills, 5 cen. U. S. mills		
Portland cement	20 cents per bbl.	Producer, reseller	Neb., Kan., Okla., Ark., Western Mo., Idaho, Mont., Wyo., Utah, Colo., N. M	Amdt. 13 MPR 224	12/11/45
Ready-mixed concrete	$ & ¢ increase Port. cement	Producer	Neb., Kan., Okla., Ark., Western Mo., Idaho, Colo., N. M.	Amdt. 21 Order 1 MPR 592	12/18/45
Portland cement	10 cents per bbl.	Manufacturer, reseller	Ga., Ala., Tenn., La., Miss., N. C., S. C., Fla., Va.	Amdt. 14 MPR 224	2/21/46

Issues Draft of Proposed Standard Hauling Contract For Nonmetals Industries

With the idea of clarifying the situation which exists when concerns in the nonmetallic-mineral industries have occasion to rent trucks which are driven by their owners, Vincent P. Ahearn, executive secretary of the National Sand & Gravel Association, the National Industrial Sand Association and the National Ready Mixed Concrete Association, has sent out to association members a draft of a proposed standard hauling contract prepared by Robert Ash, tax counsel of the ready-mixed-concrete group. The rental of owner-driven trucks presents problems in several legislative fields: the wage-and-hour law (Fair Labor Standards Act), social security and transportation-tax regulations. The problems are centered on the question of whether such owner-drivers are employees of those who rent the trucks or contractors, whether the social-security tax shall be paid by the owner-driver or by the renter, the proper handling of the transportation tax, workmen's compensation, public liability and property damage insurance, and the like.

Mr. Ahearn has invited comments on the proposed contract which is reprinted in full on page 125 of THE CONCRETE MANUFACTURER section of this issue of PIT AND QUARRY, and will welcome suggestions for changes in the present provisions or for new provisions. Letters should be addressed to Vincent P. Ahearn, executive secretary, National Ready Mixed Concrete Association, Munsey Building, Washington 4, D.C. Nonmembers as well as members may feel free to offer sugestions, according to Mr. Ahearn.

Surplus Housing to Make 200,000 Temporary Homes

According to a recent report by Wilson W. Wyatt, National Housing Expediter, building materials used by the National Housing Agency for the conversion of surplus war housing and barracks to temporary housing for veterans will be kept to the barest minimum, and will be drawn so far as possible from government surplus stocks, rather than purchased on the open market.

The N.H.A. is to have top priority in the acquisition of government surplus building materials. The Federal Public Housing Authority program, which will provide 200,000 temporary dwellings, is to use wherever possible only those building materials which are not suitable for permanent construction.

January-March Construction Passes Billion-Dollar Mark

Construction contracts were awarded for 74,677 projects to cost $1,442,493,000 in the 37 states east of the Rocky Mountains during the first quarter of 1946, it has been reported by F. W. Dodge Corporation. This was the highest dollar volume shown for the first quarter of a year since 1928, and was 134 per cent. greater than in the first quarter of 1945, when the dollar volume totaled $616,780,000.

The gains in home building were most pronounced. Residential contracts involving new buildings and alteration projects totaled $467,035,000 in the first quarter, as compared with $65,779,000 in the corresponding quarter of last year. The Dodge compilations showed that 67,115 dwelling units were called for in the first quarter contracts, as compared with 14,548 in the first quarter of last year.

Work on Angostura Dam To Begin This Summer

The call for bids for the construction of the Angostura Dam, on the Cheyenne River, the first South Dakota unit of the Missouri Basin reclamation program, was announced recently by the Chief Engineer's office of the Bureau of Reclamation.

The Angostura Dam will create a reservoir with a capacity of 200,000 acre-feet of water for irrigation, silt control and recreational purposes. The structure will be a concrete gravity-type dam with a height of 150 feet above the river bed, and a crest length of approximately 1,600 feet. A quarter-million cubic yards of concrete will be required for the construction of the dam, which is expected to get under way this summer. Completion is anticipated by late 1949.

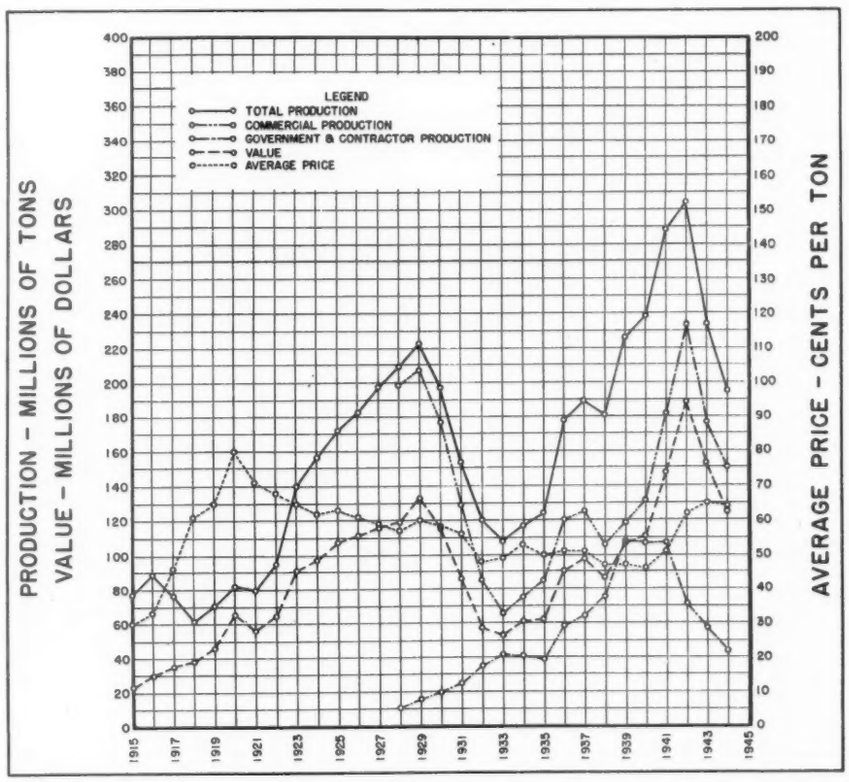
Flintkote Company Plans Laboratory and Expansion To Make Asphalt Tile

As a part of the Flintkote Company's $10,000,000 expansion program, a $1,000,000 research laboratory is to be erected at Cedar Knolls, N. J. Enlargement of the plant's facilities there is also currently being accomplished. Flintkote purchased the outstanding stock of Raybestos-Manhattan, Inc., whose wartime rubber reclaiming plant at Cedar Knolls the company has recently been operating for the manufacture of allied products.

It has been announced that the manufacture of asphalt tile will be undertaken at the enlarged Cedar Knolls plant. Additional plants are being built at Los Angeles, New Orleans and Toronto. Distribution of the tile will be through the wholly-owned subsidiaries of the firm, the Tilo-Tex Company and the Flintkote Company of Canada, Ltd.

Arkansas Highway Needs Estimated at $62,200,000

W. H. Sadler, chairman of the Arkansas state highway commission, informed Governor Laney's highway advisory committee that the minimum maintenance needs of the present Arkansas highway system would require an expenditure of $62,200,000 within the next ten years. He estimated that $22,600,000 must be spent on upkeep of the existing roads during the first five-year period, and $39,600,000 during the second five years.



Production of sand and gravel in the United States, 1915-1944—a graph prepared by the National Sand and Gravel Assn. and based on data from reports of the U. S. Bureau of Mines.

Carney Co. to Make New Products at Newly Opened Enlarged Mankato Plant

According to an announcement made by H. E. Carney, Jr., president of the Carney Co. of Mankota, Minn., this company plans to produce several new items at its expanded and completely modernized plant, which was opened recently at Mankato. The new products, developed after years of research by Carney chemists and engineers, will contribute materially to relieving the unprecedented demand for building materials.

At present the company is producing agstone, railroad ballast, road rock, concrete aggregate, Golden Fleece rock wool insulation, masonry cement and lime.

Adm. Kirby Smith Named Deputy to Wilson Wyatt

Rear Admiral Kirby Smith, USNR (Civil Engineering Corps), has been appointed General Deputy Expediter for the Veterans Emergency Housing Program by Wilson W. Wyatt, National Housing Expediter and Administrator of the National Housing Agency.

Admiral Smith, one of the Navy's top-ranking construction men during both World War I and II, was largely responsible for developing and supervising a $4,500,000,000 building program for the Navy Department in the United States, Hawaii, the Canal Zone and other strategic outposts. He retired from active duty last week.

The Admiral will be general deputy for Mr. Wyatt in charge of all operations of the program, with its goal of 2,700,000 homes started by the end of 1947. He will concentrate in the coming months on problems of supply and production.

Harvey T. Hill Addresses Diesel Manufacturers

At a meeting of mechanical engineering instructors held April 15, in San Francisco, Harvey T. Hill, executive director of the Diesel Engine Manufacturers Association, presented an address entitled "Diesel Engines—Their Present Applications and Future Markets."

Mr. Hill emphasized that each type of engine has specific applications as a power producer. He pointed out the various common applications of diesel engines and explained why this type of engine is suitable in each case. Installations cited by Mr. Hill included municipal and rural power plants, manufacturing and processing industries, mining and quarrying, oil drilling, shipping, railroading and trucking. He stated that the diesel engine had received recognition because of its low fuel consumption and operating cost and its continuous high horsepower service.

In discussing the future marketing possibilities of diesel engines, Mr. Hill quoted from surveys made in representative industries. Regarding the market in the nonmetallic minerals industry, he cited statistics from a recent survey made by PIT AND QUARRY. He declared that diesel engines will be designed to meet the requirements of new industries and applications when the demand becomes insistent.

Publications Issued On Alumina Extraction

Details of a German carbothermic process for extracting alumina from clay and the results of two American experiments in extracting alumina from clay and similar materials by a hydrochloric acid process and by hydrogen chloride gas are now available to the American public. The reports containing this information are: PB-1832, *Aluminum and Magnesium Fabrication at Leipziger-Leichtmetall-Werk-Rackwitz, Rackwitz-Leipzig, Saxony, Germany*; and PB-13983 *Extraction of Alumina from Clay and Similar Materials by Hydrochloric Acid Processes, Parts I and II.* The publications are available upon application to the Office of the Publication Board, Department of Commerce.

The National Gypsum Co. of Buffalo, N. Y., reported sales totaling $26,700,000 during 1945, the largest amount in the firm's history, despite the fact that throughout the year operations were cut to approximately 60 per cent. of capacity. The net income of $1,000,000 represented an increase of about 15 per cent. over the 1944 net figure.

The growing importance of lime in the treatment of water and wastes is evident in the fact that 10 of the 12 papers presented before the Division of Water, Sewage and Sanitation Chemistry at the annual spring meeting of the American Chemical Society dealt with this subject.

Low Price Ceilings, Labor Dissension Hamper Building Industries

Reaching the goal of full production in the building industry has been stymied by inadequate price ceilings, strikes directly and indirectly affecting production in plants and factories, inadequate and inefficient manpower, inadequate raw materials and supplies. These are the conclusions of the F. W. Dodge Corp., a fact-finding organization for the construction industry, based on a survey conducted among top executives of the nation's leading building materials and equipment producers.

Thomas S. Holden, president of the Dodge Corp., has stated that unless adquate adjustments are made, the industry will be unable to carry out the veterans' housing program and other essential construction as planned. Government regulations and the administration of the Price Control Act were cited as chief bottlenecks in the production of such building materials as masonry products, etc. The Wyatt program restricting nonresidential construction has been of deep concern to many manufacturers, and has resulted in the discontinuance of unprofitable lines.

Columbia Chemical Division Buys Plant from R.F.C.

The Columbia Chemical Division of the Pittsburgh Plate Glass Co. has purchased the large chlorine and caustic soda producing plant at Natrium, W. Va., from the Reconstruction Finance Corporation, according to E. T. Asplundh, vice-president in charge of the division. The Natrium plant, one of the largest chlorine-producing plants ever built as a single unit east of the Mississippi River, went into production in 1943.

Clay being mined at the property of H. G. Johnson near Castle Rock, Colo., by means of an International TD-6 diesel crawler tractor equipped with a ½-cu.-yd. Bucyrus-Erie dozer shovel. Operations 20 years ago were extremely hazardous, due to frequent cave-ins; but the current utilization of the TD-6 in the open-pit method is much safer because it removes the overburden and loads the clay into a truck. Approximately 20 cars of clay are loaded each month.

Agricultural Limestone Division's Executive Group Meets in Chicago

Standing (left to right): Paul I. Detweiler, New Enterprise Stone & Lime Co., New Enterprise, Pa.; Ralph S. Torgerson, Rock Products; E. E. Haapala, Zumbrota, Minn.; Otho M. Graves, General Crushed Stone Co., Easton, Pa.; P. E. Heim, Carbon Limestone Co., Youngstown, O.; Stanley A. Phillips, Pit and Quarry; Horace C. Krause, Columbia Quarry Co., St. Louis, Mo. Seated (left to right): Henry A. Huschke, managing director, Agricultural Limestone Division; Sidney P. Moore, chairman of executive committee, Concrete Materials & Construction Co., Cedar Rapids, Ia.; and J. R. Boyd, secretary-treasurer, Agricultural Limestone Division.

MEETING in the Edgewater Beach Hotel, Chicago, on May 10, the Executive Committee of the Agriculture Limestone Division of the National Crushed Stone Association discussed numerous problems of interest to the agricultural-limestone industry and the association which serves it. Sidney P. Moore, chairman of the committee, presided.

Henry A. Huschke, managing director of the division, told about the work being done in an effort to interest bankers in lending money for the purchase and application of agricultural limestone on soils which need calcium for plant growth, and distributed proofs of advertisements which the division is prepared to give in mat form to co-operating banks for running in local newspapers. These are available in two sizes, 2-column and 3-column, and deal with five themes: "Rainfall is a fine servant . . . but", "After haying, lime your meadows", "pH", "200% profit", and "Lime and Legumes, a Profitable Pair".

He told, also, of the division's having published 225,000 copies of a folder dealing with the value of agricultural limestone and of having distributed nearly the entire amount, most of which was purchased by limestone-producing members. The division is engaged in collecting data on the consumption of liming materials in the various states and in the preparation of additional limestone-promotion literature.

Mr. Huschke reported that, as a result of the recently-announced wage-price policy of the Administration, the O.P.A. is amending R.M.P.R. 386 so it can make price changes at the time wage increases are granted. R.M.P.R. is the price regulation that is applicable to producers of agricultural limestone.

The division's secretary-treasurer, J. R. Boyd, spoke about the request of the railroads for an increase of 25 per cent. in freight rates and, particularly, their request for an increase of 20 cents a ton on crushed stone, agricultural limestone, sand, gravel and slag, as set out in Ex Parte 162 before the Interstate Commerce Commission. The National Crushed Stone Association is participating with the National Sand & Gravel Association and the National Slag Association in a plea opposing the granting of the requested increase. The committee felt that, as agricultural limestone is a different commodity from aggregates, is applied to a different use, must be shipped in smaller quantities and can be shipped by truck more often than aggregates, it should be given separate consideration and different treatment, and it decided to file a separate brief in the Ex Parte 162 proceeding. It is understood that the United States Department of Agriculture is also appearing in Ex Parte 162 in opposition to the railroads' request for increases because of the upsetting of Agricultural Adjustment Agency calculations that would ensue.

During the discussion of ways of increasing membership in the Agricultural Limestone Division, Mr. Huschke revealed the fact that the division now has 180 members, of whom 156 are agricultural-limestone producers and 24 are associate members. All the committee's members were of the opinion that hundreds of other producers could well benefit by joining the division and participating in its activities and sharing in the gains that come from organized effort.

Mr. Huschke raised a question about the division's policy with regard to the program and work of the A. A. A. In the discussion which followed, consideration was given to the large number (more than 38 per cent.) of American farms operated by tenants and to the problem of whether they would continue to buy and apply the requisite amounts of agricultural limestone on their soil if the aid of the A. A. A. were to be withdrawn. It was pointed out that advocacy of increased use of agricultural limestone on our farms is a service in the national interest and, for the present at least, a service to the world also. In view of this fact, it was the expressed sense of the meeting that the Executive Committee's chairman should appoint a committee to prepare an appropriate policy statement with respect to the Conservation Materials Program and submit it to the next meeting at the board of directors for its consideration.

It was the belief of some of those present that the use of the word "lime", when agricultural limestone is meant, should be discouraged because of the resulting confusion with burned lime and in spite of the fact that the term is widely and indiscriminately employed by limestone producers themselves, agronomists, government officials, and others. It was thought to be undesirable also to use the word "agstone" as a contraction of "agricultural limestone" and that use of the two words is to be preferred despite their greater length.

In view of the fact that the National Crushed Stone Association will hold its mid-year board meeting at the Hotel New Yorker, New York, on July 18, the committee decided to hold the mid-year meeting of the division's board at the same place on the following day. It was decided, also, that the 1947 convention of the Agricultural Limestone Division will be held at the Edgewater Beach Hotel, Chicago, on January 30 and 31, immediately following that of the National Crushed Stone Association at the same place on January 27, 28 and 29.

The following committee members and division executives were present: Sidney P. Moore, chairman (Concrete Materials & Construction Company, Cedar Rapids, Ia.), J. R. Boyd, secretary-treasurer of the division, Paul I. Detweiler (New Enterprise Stone & Lime Company, New Enterprise, Pa.), Otho M. Graves (General Crushed Stone Company, Easton, Pa.), E. E. Haapala (Zumbrota, Minn.), Philip E. Heim (Carbon Limestone Company, Youngstown, O.), and Henry A. Huschke, managing director of the division. E. J. Krause, a member of the Executive Committee, could not attend because of illness, but he talked over the long-distance telephone with his son, Horace C. Krause, who came in his stead, and with Mr. Graves, so that he was present in spirit if not in person. Guests of the division were Stanley A. Phillips (PIT AND QUARRY) and Ralph S. Torgerson (*Rock Products*).

WASHINGTON NEWS LETTER

THE construction picture has undergone a complete transformation since the end of the war. At that time it was felt that the lack of organization and notoriously slow rate of expansion which characterized the building industry would limit new construction activity in 1946 to relatively modest levels. A fairly regular building cycle lasting eight or nine years was recognized historically by students of the problem as the normal trend, and on this basis at least five post-war years would have been required to achieve peak levels of activity. At the projected rate of $6,500,000,000 of new building for 1946 and $9,500,000,000 for 1947, little difficulty was expected in the availability of construction materials. It will be remembered that a large reserve of unemployed workers was freely predicted last fall, so that labor was also expected to be in ample supply to carry out the construction program.

But the huge backlog of demand for all types of building and the prospect of high profits combined to counteract "normal" tendencies in the industry, and a contra-seasonal burst of activity was experienced in the first post-war months. This upset the original calculations and necessitated a revised appraisal of construction capacity; by the turn of the year the official forecast of new construction was raised to $7,500,000,000 for 1946 and $12,000,000,000 for 1947. Attention was now focused on materials as the basic limiting factor in the construction outlook. By this time, belated recognition had been given to the extreme housing shortage throughout the country, and the Wyatt housing program was on the horizon. Only recently have the interested government agencies agreed as to the impact of that program. The latest estimates call for total new construction of almost $9,000,000,000 this year and about $13,500,000,000 in 1947.

This entire program has now been translated into materials requirements. At this stage, it is not yet clear whether, under the stimulus of various incentive measures, production of building materials will be adequate to meet the full construction total. Statements of public officials have become more and more optimistic lately, and there seems good reason to believe that the capacity of the materials industries to produce under pressure of great demand was originally underestimated just as was the capacity of the construction industry. However, the boom level of total business activity in the country has raised a new problem. For the first time, severe labor shortages loom as a very real bottleneck in the achievement of the construction forecasts. Unemployment, which has remained small throughout the reconversion period, declined somewhat in April and, with prospects for the economy as a whole continuing to look very bright, other industries will be in constant competition with construction for the limited labor supply remaining.

The volume of new building scheduled for 1946-47 has taken big jumps in the last few months, and the problems of achieving the construction goals have been the subject of a great deal of controversial discussion. It may help some if we place the present construction program in proper perspective. A basic point to be remembered is that even if the forecast level of activity were attained in 1946, new construction in that year would be less than 5 per cent. of the nation's total output of goods and services. It is significant that only in the depression years of 1932-35 was the ratio of new construction to gross national product as low as this. In boom years, on the other hand, such as in the 1923-29 period, new construction accounted for over 11 per cent. of total output and hit a high of over 12 per cent. in 1926-27. Even in the recovery period of 1936-39, construction made up more than 7 per cent. of the nation's product. Of course, this does not mean that it would necessarily be desirable to increase the proportion of the nation's resources devoted to construction at this time. It is a fact that extreme fluctuations in construction activity in the past have constituted one of the principal unstabilizing influences in the economy, and this condition has undoubtedly been aggravated by unrestrained building booms and their subsequent collapse. In a modern industrial society, new construction occupies a strategic position out of all proportion to its immediate dollar value, primarily because it is the most important single outlet in the economy for investment.

Nevertheless, the attainment of a prosperity such as we are now experiencing must be considered a remarkable development in the face of the low percentage of construction to total economic activity. Even the larger building program scheduled for 1947 will constitute no more than 7 per cent. of total national production. A major conclusion to be drawn is that even after the present two-year program is completed, there will be ample demand to support a high level of construction activity for many years to come. Provided it is not frightened into a buyers' strike by runaway prices, this demand could serve as the hard core of business prosperity for at least the next few years.

In view of the wide discussion in some circles as to the feasibility of the housing program, it is significant to note that residential building accounts for less than half the total of new construction — about $4,000,000,000 in 1946 and $6,500,000,000 in 1947. The Wyatt goals for conventional housing — 650,000 dwellings to be started in 1946 and 850,000 in 1947—were originally hailed as extremely ambitious and difficult of achievement. However, progress in the early months of the year has been so favorable, that some officials are now wondering whether the goals were not set much too low. Government reports show that in the first four months of 1946, 215,000 new conventional dwellings were started. In April alone, work was begun on 65,000 such units. Simple arithmetic shows that we are already above the rate required to do the Wyatt program for 1946, and much higher levels of activity are still ahead. Only the indiscriminate approval of non-residential forms of construction, and the dissipation of large quantities of building materials and labor for less essential purposes, would seem to stand in the way of delivering the houses which are in such urgent demand.

Complete but condensed information on nonmetallic minerals production is contained in the statistics chapter of the Pit and Quarry Handbook.

Gravel Producer Completing System for Wholesale Deliveries

By W. E. TRAUFFER

another ON THE SPOT report

THE Metropolitan Sand & Gravel Corp., which has for many years been one of the largest producers of sand and gravel supplying the New York Metropolitan Area, in 1942 solved a production problem by building a new plant at Port Washington and remodeling its plant at Northport, New York. These plants are located along the north shore of Long Island in the area from which comes over 90 per cent. of the sand and gravel used annually in this market. These plants have no rail connections and only a small part of their output is delivered locally by trucks. The company is essentially a wholesaler and most of its output is delivered in deck scows to retail dealers' docks in New York City and at New Jersey and Connecticut shore points.

Now that the war is over and the post-war construction boom is gathering momentum the demand for aggregates in this area is far exceeding the normal volume of 8 million cubic yards annually; some authorities think it will reach a 12-million cubic yard peak. This large and growing volume of demand has created a transportation problem as the floating equipment available in this area is inadequate. In the case of this company the plant productive capacity far exceeds the transportation capacity. Confronted with only two alternatives—either to use its present equipment more effectively, or to buy more equipment—the company chose the former.

Careful study showed that by providing improved terminal facilities to increase the turn-around efficiency of its floating equipment the capacity of the existing fleet could be doubled. Three strategically-located terminals are now being built which are within 3 miles of 85 per cent. of the aggregate market in New York City. These have a minimum of 12 feet of water at low tide in open water and these features, with a large shore storage capacity, are expected to give the desired results. From 4 to 6 scows will be handled into these terminals at one time with a quick turn-around. The services of these plants will be offered to dealers and to ready-mixed concrete producers who are already in operation in this field and sales will be made f.o.b. their trucks. Dealers who prefer the present arrangement will continue to receive scow deliveries direct to their own docks.

The first plant to be completed is located at the foot of Tiffany St., in the Bronx. This was nearly completed when the writer visited it early in May and should be in operation early in June. The plant at Greenpoint, Long Island, should be ready early in July, and the one at Flushing on Flushing Bay by early September.

The accompanying map shows the locations of these terminals and of the two stake boats where loaded scows will be temporarily tied up while others are being delivered by the tug. Up to 20 loaded scows will be towed at one time from the producing plants to Stake 2 and from there 4 to 6 will be delivered to each of the three terminals. The remaining scows will then be towed to Stake 1 from which they will be distributed to New Jersey and Hudson River points.

Each terminal will also have provisions for the storage of crushed stone and this will be brought in scows down the Hudson River to Stake 1 and be distributed from there. The tug which brings down loaded gravel scows will haul empty

Right: Map showing system for water delivery of sand and gravel to New York metropolitan area from Long Island plants.

The sand and gravel plant near Port Washington, L.I., which was built in 1942. At right is the truck-loading building. Scow loading conveyor to right is not shown.

The Greenpoint terminal shown under construction. In the background is some of the New York City skyline.

The nearly completed Bronx terminal viewed from the dock at which aggregates and cement are received in scows. From right to left are the main concrete silos and the steel tank for aggregate and cement storage and the loose-material and batching bins for truck loading.

scows and some loaded stone scows on its return trip to the plant, delivering the latter as it picks up empties at the terminals. By means of a pool with the crushed stone producer much cross-hauling of empty barges will be eliminated. The Metropolitan Sand & Gravel Corporation's fleet at present consists of sixty 800-ton deck scows and four tugboats. Three of the tugs are used for the long hauls and one serves the plants. One is a new boat with a 650-hp. Busch-Sulzer Diesel engine. It is planned to add from ten to fifteen 1,500- to 2,000-ton steel scows during the next few years.

The three terminals will be basically similar, the only differences being those made necessary by the topography. Each will have dock facilities for from 4 to 6 loaded scows and the same number of empties. Any future developments such as self-unloading boats, etc., are provided for. Two-cu. yd. clamshell buckets will be used to unload from the scows to hoppers on the docks. Two of these will be handled by electric whirleys on piers. At the Greenpoint plant a Diesel crawler crane will be used.

Cement will be received in L.C.L. containers on scows and will be unloaded into hoppers on the docks. A Robinson pneumatic conveying system at each plant will carry the cement to a pair of 2,000-bbl. capacity, 2-compartment C. S. Johnson steel storage bins. Another Robinson system will convey the cement to batcher bins.

At each plant the aggregates will be carried on a belt conveyor to the center of a circle of 1,000-cu. yd. capacity concrete silos. There are 9 silos at the Bronx plant and there will be 10 at each of the others. From this conveyor the material will be discharged onto a radial conveyor from which it can be discharged either into the silos or completely beyond them to ground storage when the bins are full. The silos also have outside openings near ground level so that trucks can be loaded direct by means of bucket loaders.

Ground-level openings on the sides of the silos inside the circle will allow the materials to be withdrawn from the desired silos on a radial conveyor from which a pair of inclined conveyors will feed to four loose-material bins of 150-cu. yd. capacity each. Retailers' trucks will be loaded under these bins.

The material can also be bypassed to another pair of conveyors feeding

(*Continued on page 80*)

European Nonmetals and Rotary Lime Kilns Featured at C.I.M.M. Meeting

another ON THE SPOT report

THE Canadian Institute of Mining and Metallurgy on April 9, 10 and 11, 1946, held its annual meeting at the Mount Royal Hotel, Montreal. There was a record attendance and several hundred were turned away due to the lack of hotel accommodations. This was also the second annual meeting of the Industrial Minerals Division, a small but growing part of a body composed largely of metal miners.

At the meeting of the Industrial Minerals Division, M. F. Goudge, Canadian Bureau of Mines, in *Utilizing Industrial Minerals in Germany,* reported some of his findings as a member of a commission which inspected German industry several months ago. According to Mr. Goudge very few industries are operating, most of the cities are in ruins, and there is no coal, but some of the cement and lime plants are operating in order to provide materials for reconstruction.

The cement industry, said Mr. Goudge, is in most respects behind American practice, using obsolete equipment in the quarries, including drills with solid steel, hand loading, etc. One plant, he said, makes white cement from ordinary raw materials by the addition of 2 per cent. of borax and fusing in a kiln in a reducing atmosphere after which water quenching is done.

A Dyckerhoff plant in the Sudetenland which makes alumina from clay and limestone was described by Mr. Goudge. A 25 per cent. alumina clay is ground with high-calcium limestone in wet ball mills. The material is then filtered and calcined in a rotary kiln at a temperature of 1,400 deg. C., resulting in a clinker with a 15 per cent. alumina content. Portland cement is produced as a by-product. Some plants, he said, are still using vertical kilns and most of them seem to be very poorly managed.

In Italy, which the party also visited, Mr. Goudge said that a cement was being made in an electro-metallurgical plant, the fluid being water cooled before grinding. This cement is then mixed with Portland cement.

Most impressive, said Mr. Goudge, was the cleanliness of the plants and the fact that nothing is wasted. Anhydrite is being used for the manufacture of acids and ammonium sulphate fertilizer.

There is no natural mica in Germany, according to Mr. Goudge, but it was being made synthetically by several processes. One process developed by the firm of Siemens and Halske in cooperation with the Kaiser Wilhelm Institute produces a good phlogopite mica. A mixture containing 30 per cent. of pure precipitated silica, 11 per cent. alumina, sodium, etc., is ground, pelletized, and then placed in crucibles. After heating to 900 deg. C. in an electric furnace this is placed in a gas-fired furnace and heated for two days at a 1,450-deg. temperature. It is then reversed through the same procedure and is cooled to atmosphere in 5 days, completing a 10-day cycle. The resulting mica, according to Mr. Goudge, is nearly perfect, containing about 3.4 per cent. water, but is slightly hard. It costs nearly three times as much as natural mica.

M. F. GOUDGE
Canadian Bureau of Mines

Another process which has only reached the laboratory stage uses fluorine, but the cost is nearly 60 times that of natural mica.

Mr. Goudge also described a method for making synthetic piezo-electric quartz crystals. Another attempt to make chrysotile asbestos actually did make amphibole. A mixture of precipitated silica and fluorides of magnesium, ammonia and calcium was heated to 400 deg. C. in 50-foot long by 15-foot square gas-fired furnaces. The fibers were then made from the powdered mass. The recovery was 20 per cent, at a cost 60 times that for natural asbestos. The product, he said, was used for acid filter fiber and the fines for magnesia insulation. The Germans, said Mr. Goudge, feel that Canadian asbestos is the best, with the Russian second.

Three rock wool plants near Gelsenkirchen were described by Mr. Goudge. These have 15-foot shaft kilns of 5-foot interior diameter which are fed a mixture of coke and slag. The hot zones of the kilns are water cooled. A shot-free wool is obtained by letting the flying wool hit a steel ball suspended from a cable. The shot drops and the wool flies on but this method damages the fibers.

Mr. Goudge also showed slides of a magnesite plant in which lifters in the 350-ft. kilns create dust intentionally so that it can be collected in two Cottrells. He also showed views of an older plant in Austria which uses shaft kilns.

In answer to questions Mr. Goudge said that the cement, magnesite and other industrial minerals plants suffered little war damage, as most of the Allied effort was aimed at bridges, railroads and highways and at coal and steel plants in order to paralyze all industry at its source. He also said that Germany obtained large supplies of mica, asbestos and other materials from conquered countries.

At the 1945 meeting a leading authority on vertical lime kilns presented a paper on that subject. At this meeting W. R. Cliffe, consulting engineer and leading authority on lime production, gave a paper entitled *Producing Lime in Rotary Kilns.* Mr. Cliffe said that the return on the investment made is the best indication of which is the best type of plant under varying circumstances. The rotary kiln, he said, produces a more uniform, purer and higher grade of lime which is growing in demand, and as a result more and more rotary kiln plants are being built.

The differences between the two types of plants, he said, begin in the quarry. If a fast explosive is used even the larger rocks are cracked and disintegrate under heat and handling, blocking up a vertical kiln. This type of rock causes no trouble

in a rotary kiln. In loading stone for vertical kilns, said Mr. Cliffe, hand forkings also get in with the rock and the resultant blocking causes underburning in the center and fusing with the lining at the walls of the kiln. In the rotary kiln, he said, the fine material finds the center of the bed but is only slightly underburned as a result.

In crushing stone for a vertical kiln elongated pieces will cause trouble. Stone from 10 down to 3 inches in size is best but at least 30 per cent. of the crushed stone will be under 3 inches and must be sold as rock, agstone, etc., or wasted, according to Mr. Cliffe. The rotary kiln, he said, uses material from 1½-inch down to ⅛-inch in size, leaving only 5 per cent. of the total to be disposed of. The finer sizes used can readily be blended with the larger ones for the best results.

Mr. Cliffe said that the practice of providing stone storage ahead of the kilns is growing, especially with the trend toward week-end shutdowns which sometimes amount to 3 or 4 days over holidays. Such storage, he said, is a problem for vertical kilns but not for rotaries as the finer stone is much easier to store and rehandle.

Vertical kilns are fed by cars through charging doors and as these are opened and closed changes take place in burning conditions inside the kiln. Such a kiln is usually charged only for 8 hours out of 24 so that during the night the column of rock will drop 15 to 20 feet as periodic drawings are made. By morning, said the speaker, the remaining stone is very hot. Then a large amount of cold and wet stone is dumped in during a short period of time, again throwing off the heat balance. There is no such problem in the rotary kiln in which burning is a continuous controlled process. Only part of the lime produced in a vertical kiln is well burned, according to Mr. Cliffe, and as a result much picking and handling is necessary. This work, he said, must be considered part of the burning cost. The cooling of the drawing doors introduces another uncontrollable variable into vertical kiln operation. Natural gas is the only good method of firing them, all other fuels causing trouble. The rotary kiln, on the other hand, can be fired almost equally well with many types of fuel, and control is quick and accurate. The lining replacement cost, Mr. Cliffe admitted, is higher in a rotary kiln, about 25 cents per ton compared to 10 for the vertical, but its other advantages more than make up for this. The best rotary kilns, he claimed, now are equal to verticals in fuel efficiency, some of them approaching 5 million B.t.u. per ton. He also described the controls—mechanical, heat, firing, etc., which a vertical kiln does not have.

In comparing the original investment for a plant with a capacity of 100 tons per hour Mr. Cliffe said that a vertical kiln operation would cost $112,500 compared to $225,000 for a rotary plant. Depreciation, at 6 per cent., is 45 cents per ton for a rotary and half that for a vertical, but labor cost for the vertical is 2 or 3 times as great. This, he said, gives the vertical kiln only the advantage of first cost and it is practical only when a capacity of 60 tons daily or less is desired or where a high-grade lime is not needed.

W. R. CLIFFE
Consulting Engineer

In answer to questions Mr. Cliffe said that the most efficient length for a rotary kiln is about 292 feet but that this will vary with conditions. Such kilns are being operated which have internal heat exchangers made of both refractories and heat-resisting metal and which have an exit gas temperature of 500 deg. F. with no excess air. He also cited the experience of one large lime company which had 96 vertical kilns in the early 20's when the first rotary was installed. Ninety of them have now been replaced with rotaries because of the demand for their better product.

A producer cited the experience of his company which at one time operated 12 vertical kilns and employed 100 men. One rotary was first installed and now seven are in operation with a capacity of 700 tons daily and a crew of only 30 men. He expressed his belief that heat exchangers can be developed which will bring the economical length of a kiln down to 175 or 200 feet.

In discussing ring formation Mr. Cliffe said that rings occur in proportion to the extent to which the kiln is pushed. He said that one kiln designed for a capacity of 105 tons daily gave little trouble but when forced to 175 tons rings blocked the kiln in from 6 to 10 days. He also recommended grinding coal to at least 90 per cent. through 200-mesh for efficiency and to hold down ring formation. The finer sizes of stone, he said, give the best fuel efficiency but cause the most rings.

In a paper on *The Roofing-Granule Industry,* V. L. Eardley-Wilmot gave some interesting facts and figures. In spite of the fact that Canadian production of this material has quadrupled in the last ten years most of its needs are still imported from the United States. Last year 14 companies produced 77,000 tons of granules, compared to 40 companies with 90 plants producing about one million tons in the U. S. Several new plants, he said, are to be built in Canada.

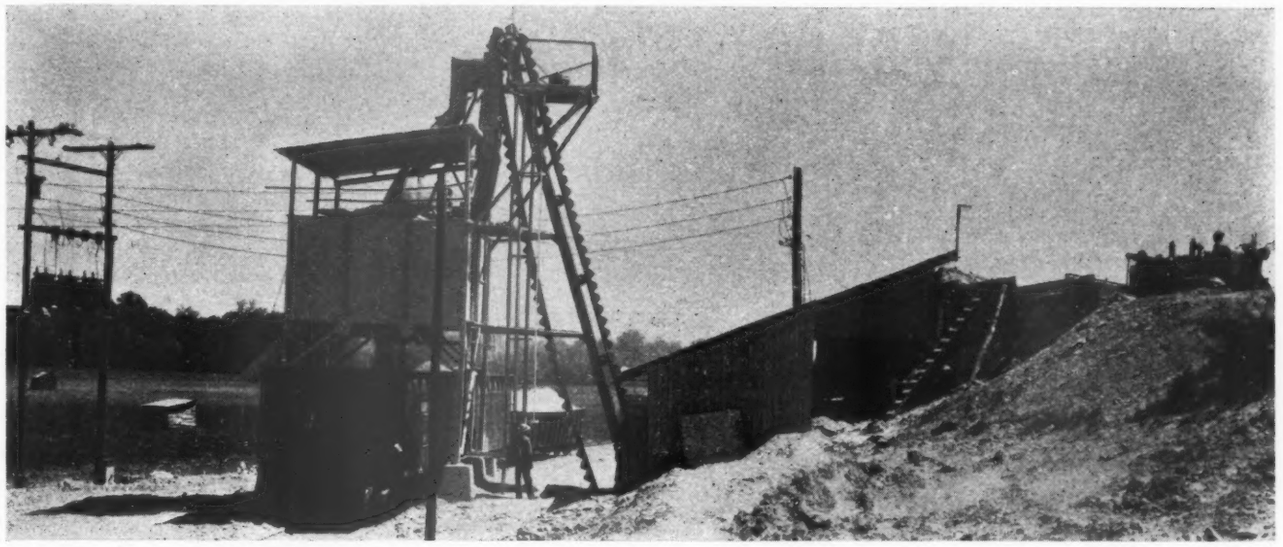
Mr. Eardley-Wilmot then gave an interesting description of the characteristics necessary in this material, the methods of coloring, etc. Slides and samples were used to illustrate the various types and colors of roofing made.

A. G. Roach presented the same paper on *Craigmont Corundum* which was given at the recent A. I. M. E. meeting in Chicago. He described the plant which was built to alleviate the shortage of this vital material during the war and the pilot plant which preceded it. In the flow-sheet are concentrating tables, vibrating screens, rod mills, Dow classifiers, Fahrenwald sizers, thickeners, wet magnetic separators, etc. The 95 per cent. pure product is shipped to the United States for final magnetic separation. This plant has produced 90,000 tons to date and operations will cease in September of this year. It is, he said, the one remaining war baby.

$100,000 Stearns-Donner Plant Nearly Completed

Work on the $100,000 sand-and-gravel plant under construction for C. H. Stearns and D. E. Donner is rapidly nearing completion near Chico, Calif. In addition to the plant, which will include a 54-ton cement silo, a shop, office building and warehouse and will feature a crusher with a 480-ton-per-hour capacity, there will also be facilities for the manufacture of ready-mixed concrete. The latter product, however, will be handled by the Ready Mix Concrete Co., owned by L. L. Ultican.

Unique Methods and Equipment Used At Mississippi's Lime Plant No. 2



A general view of the Mississippi State Lime Plant No. 2 located near Cedar Bluff, Miss.

another ON THE SPOT report

IN August, 1945, the Mississippi State Lime Board placed in operation in Clay County near Cedar Bluff, Mississippi, the second state-owned plant for the production of agricultural limestone. Successful experiments carried on at the state's Number One plant near Brandon (described in the May, 1944, issue of PIT AND QUARRY) culminated in the development of this new and much larger unit in the farm rehabilitation program of the state of Mississippi.

The Number 2 plant is located on the Selma and Prairie Bluff chalks which are found in some 13 counties in the northeastern part of the state. Although impurities such as sand, clay, mica and pyrite are present in varying degrees, the Selma chalk lime is said to be 100 per cent. soluble, and to test close to 93 per cent. $CaCO_3$. The massive, uniformly-textured brittle chalk is so thick that 20 to 40 feet can commonly be worked and it is thought to offer the simplest production problems of any of the limestone deposits available in the state.

Col. John W. Thames, manager of the Cedar Bluff plant.

One of the unusual aspects of the operation is the method of recovery being employed. Approximately 6 feet of clay overburden is removed with tractor bulldozers, and mud pockets, when they are encountered, are cleaned out with considerable

By WILLIAM M. AVERY

care. During the past winter while the plant was not in operation a strip 400 yards long and 150 yards wide was cleared in preparation for the current year's operations. A two-shank rooter drawn by an Allis-Chalmers HD-14 tractor is used to root out or "harvest" the slab-shaped rocks, which vary from 6 to 15 inches in major dimensions. The rooter, which was supplied by the Southwest Welding & Manufacturing Company, cuts to a depth of about 24 inches.

When the rooter is operating fairly close to the plant proper, an International TD-18 tractor bulldozes the stone to the plant feeder. A LeTourneau 5-cubic-yard pan drawn by an International TD-14 tractor is used to haul the stone from more distant points. When stones larger than 20 inches are encountered, they are shoved aside and broken up by the tractor before being fed to the plant. An 8½-cubic yard LeTourneau Overpan is also available for use in both haulage and stripping operations.

Below: Stone being bulldozed into the hopper above the feeder by one of the tractors.

The pulverizing unit is a Dixie 36- by 40-inch non-clog swing hammer crusher, driven by a Fairbanks-Morse 150-horsepower slip ring motor. The raw stone is bulldozed directly into the 40-inch wide by 10-foot long apron feeder which discharges into the pulverizer. The feeder, which was also supplied by Dixie, is driven by a 13-horsepower Reeves variable speed Moto-Reducer. Stone is fed to the pulverizer at the rate of 60 to 70 tons per hour. Although the maximum opening is 3/8-inch, 95 per cent. of the product passes 10 mesh, the extreme fineness being made possible by the addition of several tiers of diagonal cage bars.

Far from being hard and brittle, the limestone in the Selma formation is soft and sticky and correspondingly difficult to pulverize. Even with average moisture present in the stone, the material has a tendency to clog most crushers, and it was only after considerable study of a number of different make machines that the present equipment was adopted.

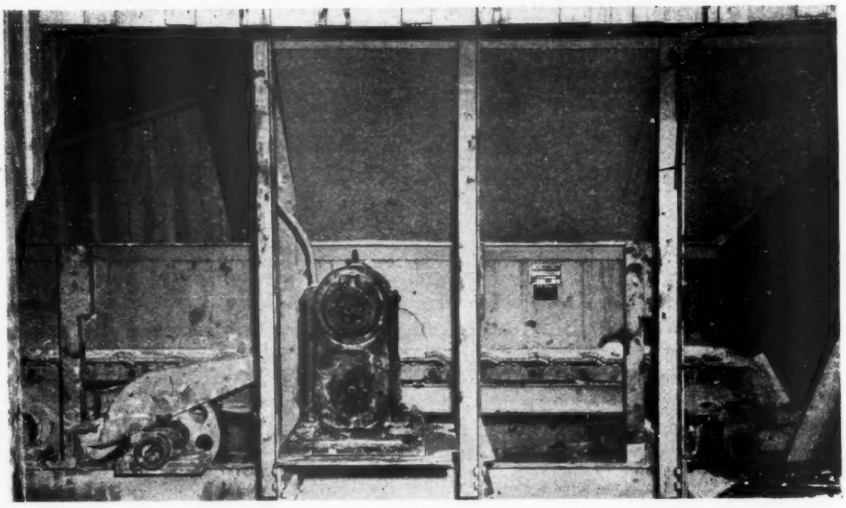
An outstanding feature in the design of the plant is the interlocking of the control apparatus and electronic control device with the main crusher motor and the feeder motor. When the load on the crusher drive exceeds its rated capacity by 10 per cent., the feeder stops automatically. This arrangement makes it possible to maintain a uniform load on the mill, and prevents the "slugging" that so frequently occurs with manually-controlled operations.

With the variable-speed drive on the feeder, the rate of feed can be controlled to meet varying conditions. For example, the rate of feed can be reduced when the moisture content of the feed stone is running too high, or increased when dry feed makes it possible to crush at a higher rate. The importance of such flexibility is evident from the fact that although the nominal capacity of the crusher is 25 to 30 tons per hour, during the dry season it is possible to pulverize at the rate of 70 to 80 tons per hour.

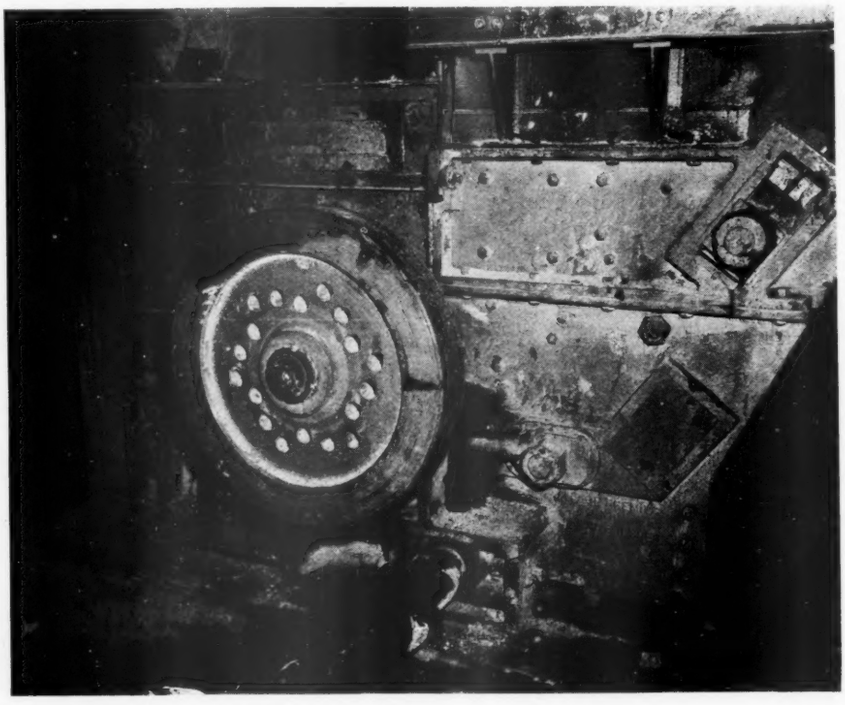
The ground limestone drops from the pulverizer into a bucket elevator which discharges into a 100-ton steel bin above the railway siding. Chutes in the side of the bin make it possible to load trucks for local deliveries, but most of the material produced is delivered by rail. During the winter the plant siding was lengthened to accommodate 10 cars, and it is anticipated that this year at least 1,000 carloads will be shipped to some 20 counties in the state. Because of the high-solubility of the limestone it has a pronounced tendency to set hard

(Continued on page 80)

A 5-cu.-yd. pan is used to haul stone to the plant from distant points in the quarry.



Above: The 40-in. by 10-ft. apron feeder has a variable speed drive and is also interlocked through an electric control device with the crusher drive, to relieve overload. Below: The 36- by 40-inch non-clog swing hammer crusher.



PRACTICAL SUGGESTIONS FOR TRACK-TYPE TRACTOR MAINTENANCE

By C. K. HEDGES
Service Development Manager
Caterpillar Tractor Company

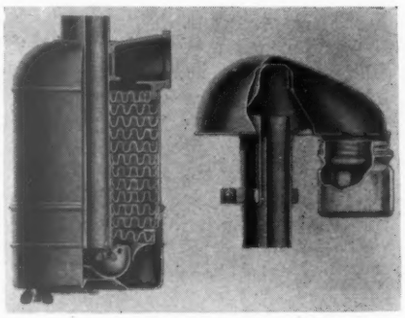
another P&Q exclusive

MODERN methods of mining and processing sand, rock and gravel require the use of large numbers of track-type tractors. Removing overburden, loading, hauling, and building access roads provide jobs for which the track-type tractor is particularly well adapted, being specifically designed to do such jobs economically and with dispatch under operating conditions which might prove well nigh hopeless for any other type of mechanized equipment.

The cost of operating track-type tractors for doing this type work is always a subject of prime interest to the owner, since it has a direct bearing on net profit or loss. Some of the items which make up operating costs are fairly well fixed, in the sense that they can be estimated in advance with a fair degree of exactness. These consist of original purchase price, labor costs, cost of fuel and oil and the cost of parts that have to be replaced due to normal wear and depreciation. One important figure remains which cannot be estimated in advance, and which causes operating costs to fluctuate; and that is the cost of accidents, premature wear and damage to vital parts incurred through faulty maintenance or careless operation.

The track-type tractor is designed and built with full knowledge on the part of the manufacturer that the eventual usage of the tractor may be under conditions that are usually far from ideal, that the operator may be an unlettered native of Timbuktu and that maintenance may be handled on an "if and when" basis—"if" part of the tractor falls off, and "when" some one happens to be in the mood to change the oil or tighten the clutch adjustment. To combat such conditions the design of the track-type tractor has been continually advanced over the years to simplify operation, reduce the number of operating adjustments to the barest minimum, and make lubrication so simple that there can be no excuse for errors or omissions. Some day this trend may produce a tractor that is lifetime lubricated, permanently adjusted and operated by remote control; but today's machines must still receive a degree of consideration from the operator and maintenance man if the potential service life built in by the manufacturer is to be fully realized.

The general term "maintenance," as applied to track-type tractors,



Sectional view of modern oil-bath-type air cleaner and pre-cleaner.

may be considered as four separate operations:

1. Prevention of abrasives and other foreign matter from gaining access to working parts;
2. Lubrication of working parts;
3. Adjustments to compensate for normal wear;
4. Tightening of loose nuts and bolts, and minor replacements.

Let us consider each of these subjects in turn:

1. *Prevention of abrasives and other foreign matter from gaining access to working parts.*

Wherever possible, the manufacturer seals the track-type tractor against its arch enemy, abrasives, in such a way that barring accident to seals, gaskets, etc., abrasives are kept out. There are a number of points, however, where abrasives can enter as a result of neglect on the part of the maintenance man; and, beyond warning the owner, there is nothing the manufacturer can do to prevent this.

a. *Engine air inlet.* Internal combustion engines must have air in order to run—air in large quantities, and air that may be heavily loaded with dust, pulverized rock or fine sand. Obviously, these abrasives must be removed from the air before it enters the engine, or pistons, rings and liners wouldn't last long enough to make it worth while to start the engine. Tractor engines are accordingly equipped with an air cleaner, usually of the oil-bath type. This type cleaner is remarkably efficient, extracting more than 99 per cent. of the dust particles in the air as long as it is cared for in accordance with the manufacturer's recommendations.

The collected dust and abrasives must be removed from the cleaner periodically. Obviously, there is a limit to how much dust can be absorbed by the oil in the cleaner, and when this limit is reached, increasing amounts of abrasives are carried over into the engine. The air cleaner should be serviced regularly, without fail, in accordance with manufacturer's recommendations.

The correct weight of oil should be used in the air cleaner. Contrary to the impression of some operators, the air is not cleaned by the simple process of bubbling the air through oil. The oil is thrown into the screens by the velocity of incoming air, and the dust is collected as it passes over these oil-coated screens. The dirty oil travels to the outside of the screen where air velocity is lowest, drops back into the oil cup where some of the dust precipitates out, and is then returned to the screens. It is all a definite and carefully worked out cycle. If the oil is too light, it may be carried completely through the cleaner into the engine, taking dirt particles with it. If the oil is too heavy, it will not travel through the cleaning cycle as intended. *Follow the manufacturer's recommendations.*

If the air cleaner is equipped with a pre-cleaner, the jar should be emptied of collected dust before it is three-fourths full. Tests show that pre-cleaners virtually stop functioning after the level of dirt in the collecting jar reaches this limit.

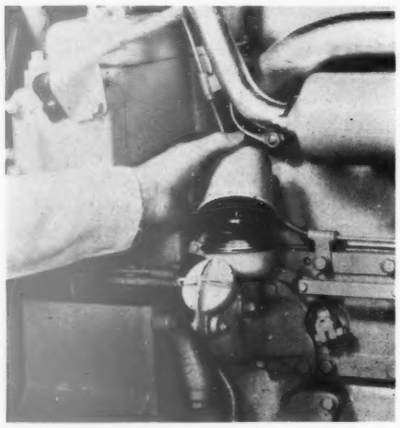
Periodically, the center tube in the air cleaner should be cleaned of the mixture of oil and dust that builds up on the sides of the tube. This deposit restricts the flow of air so that it enters the cleaner screens at higher velocity than it should for maximum cleaning efficiency. Push a rag through the tube with a bar, after removing pre-cleaner and oil cup.

b. *Exhaust pipe.* Whenever an engine is left out in the open, and the engine not running, the exhaust pipe presents an open passage-way into the heart of the engine for rain and, under certain conditions, dust. Every year a large number of engines are seriously damaged because of the presence of water in the cylinders, with disastrous results when

an attempt is made to start the engine.

A used tin can is carried by many operators to cap the exhaust pipe, when the tractor is parked.

c. *Engine and gear case breathers.* To prevent building up pressure, en-



Breathers fulfill the important function of allowing moisture-laden gases to escape from closed compartments, such as the crankcase.

gine, crankcases and gear compartments must be equipped with breathers. These breathers are designed to let pressure out without letting dirt or dust in. Nevertheless they should be given periodic attention to insure proper functioning.

d. *Cooling system.* The harmful substance which may enter the engine through the cooling system is not abrasive, but lime deposit. It is not always possible to obtain "soft" (free from mineral) water for the cooling system, but every effort should be made to do so. If "hard" water must be used, the cooling system should be cleaned out regularly, using a cleaning solution for dissolving deposited lime.

Lime deposits in cylinder head as a result of using hard water.

Most of the cylinder heads that have to be replaced on tractor engines are cracked as a direct result of excessive lime deposits in the cooling passages.

e. *Fuel system.* Dirt can be introduced into the engine along with the fuel. Fortunately, modern engines are now generally equipped with fuel filters that will collect even microscopic dirt, thus protecting the engine, but care in fuel handling will reduce the frequency of changing filter elements.

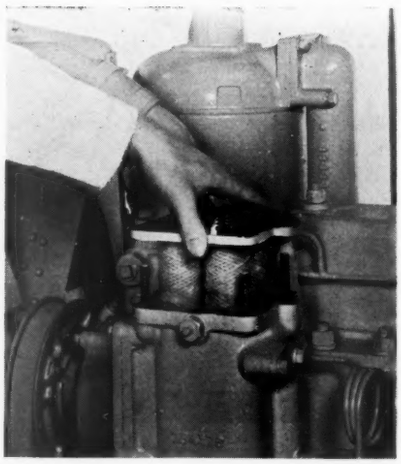
Condensation of moisture in the fuel tank may introduce relatively large amounts of water into the fuel. This condition can be prevented quite simply by adopting a practice of always filling the tank at the close of the day's work, thereby driving the moisture-laden air out of the tank before the cool air of the evening can start condensing the moisture out of the air.

f. *Oiling system.* Except in rare circumstances, the presence of abrasives in the oiling system comes about through the release of abrasive material inside the engine. These abrasives are screened out by the oil filter, but as was emphasized in connection with the air cleaner, unless the oil filter is properly cared for, it will approach a limit beyond which it is powerless to remove additional abrasives from the oil. *Clean and replace filter elements at the recommended interval. Use only the type of replaceable filter element recommended by the manufacturer.* There are numberless makes and types of replaceable filter elements on the market, and many are the extravagant claims made by irresponsible salesmen in an effort to make a sale. Bear in mind that the manufacturer of your tractor has a much greater interest in the welfare of your machine than itinerant filter salesmen.

g. *Grease fittings.* There are a number of points on the track-type tractor where grease is applied to bearings by means of volume compressors, grease guns, etc. If there is any dirt on the head of the grease fitting, it will naturally be pumped into the bearing along with the grease. *Wipe all grease fittings before attaching the grease gun or hose.*

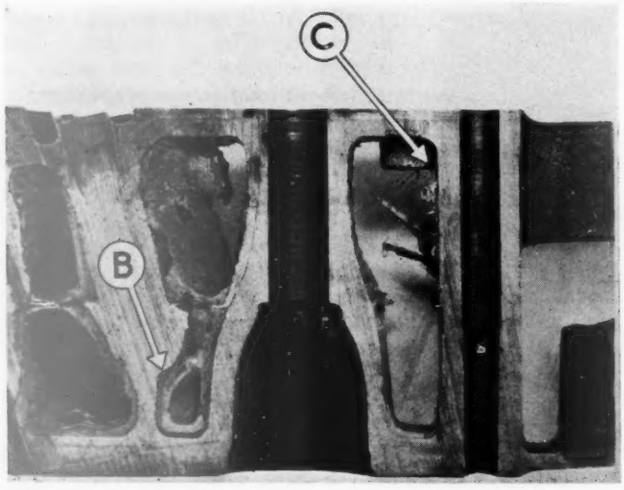
2. *Lubrication of working parts.* There are three important items to consider in obtaining proper lubrication of working parts — (a) selecting proper types and weights of lubricant, (b) lubricating at proper intervals and (c) using the correct amount of lubricant.

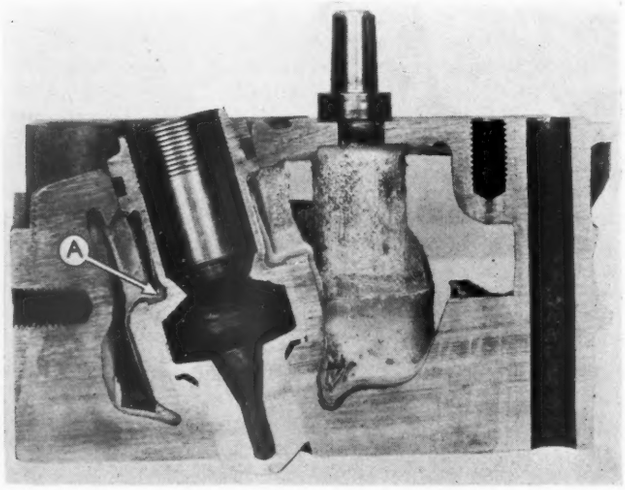
(a) *Selection of lubricants.* The oil companies have been most cooperative in assisting tractor owners



The fuel filter on diesel engines protects the extremely small clearances in pumps and valves from abrasives.

to obtain the proper types and weights of lubricant for their equipment. Oil salesmen are generally well informed on the manufacturer's recommendations; and through purchasing their lubricants from reputable firms most tractor owners have very little difficulty in this respect.





When in doubt, a telephone call or a letter to the tractor dealer will bring authoritative information and recommendations.

(b) *Lubricate at proper intervals.* At this point many tractor owners get into difficulty. They fail to maintain lubrication records so that they can be sure the tractor gets new or additional lubricant at the recommended time. It would be fairly simple to get along without such records if the time interval was the same for every lubrication point on the tractor; but since this interval varies for engine crankcase, track rollers, transmission, final drive compartments, fan bearings, etc., trying to rely on memory alone can only result in confusion, with some parts over-lubricated and some parts under-lubricated—and some parts not lubricated at all.

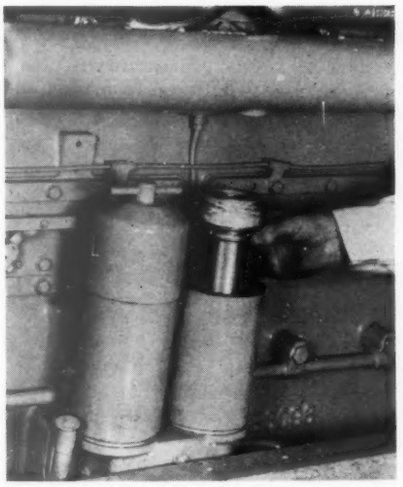
Such records are easy to set up. Consult the instruction book furnished with the machine for the proper lubrication interval for each point on the tractor. List the various points on a sheet or in a notebook, arranging them so that all points to be lubricated at the same interval are grouped together. After each lubrication, according to the schedule thus set up, enter the date or hour-meter reading when attention is again due. A daily check of this record will keep all points cared for at the proper time.

(c) *Use the correct amount of lubricant.* There was a time when a grease fitting on a tractor was an indication to the maintenance man that he should pump grease into it until the grease pump refused to pump further, or excess grease appeared around the bearing. On modern machines the rules have been changed; hence, maintenance men should study instruction books carefully. Today, most exposed bearings are sealed against the entrance of dust and dirt by means of rawhide seals, bellows-type seals, etc. Excessive grease pressure may rupture these seals, leading to rapid wear of bearings as dirt enters through the ruined seal. Modern grease gun or volume compressor can build up pressures as high as 3,500 pounds per square inch. Maintenance men should study the construction of the machines under their care, so that they may avoid unwittingly damaging the parts they are trying to protect.

3. *Adjustments.*

Brakes, clutches, fan belts, tracks, valves, water pump packing, etc., are all points at which wear is expected to occur while the machine is being operated, and periodic adjustment to compensate for such wear must be made. The maintenance man should study the instruction book carefully, so that he will be completely familiar with his duties in this respect.

Regarding adjustments, the most common errors made by maintenance men fall into three groups: (a) making adjustments when it is convenient instead of when a prompt need for adjustment is indicated, (b) completely neglecting points where adjustment is required infrequently, so that the maintenance man gets out of the habit of checking them, and (c) disturbing factory adjustments, without the necessary skill or knowledge to restore correct adjustments.



Cleaning the oil filter screens and replacing the absorbent-type filter element should be done periodically.

(a) *Make adjustments when needed—not when convenient.* The tractor can be operated in a fairly satisfactory manner after a clutch starts slipping, but this slippage is creating heat and wear. A loose fan belt will continue to turn the fan, but slippage will wear the belt and the fan pulley. In all such examples, it can be quickly demonstrated that maintaining correct adjustment at all times prolongs the life of the machine.

(b) *Infrequent adjustments.* At some points in the track-type tractor the construction is such that, while wear occurs, it takes place so slowly that adjustment to compensate for such wear may be necessary only when the tractor is brought to the shop for general reconditioning. The final drive sprocket bearings which are generally tapered roller bearings, provide a good example. As the bearings wear, the sprocket adjustment loosens, allowing it to wobble slightly. This condition, while not usually apparent due to the slow speed of the sprocket, may damage the seals and greatly shorten the life of the bearings. A simple adjustment of the bearings would avoid this possibility, but because this adjustment is required so seldom it may not occur to the maintenance man to check for looseness until visible damage has occurred.

Here again is illustrated the value of the maintenance man having a good general knowledge of the construction of the tractor.

(c) *Disturbing factory adjustments.* The purchaser of the track-type tractor obviously has the right to do anything he pleases with it, as it is his machine. However, he should remember that the manufacturer has done everything possible to insure maximum performance and service life, and any changes the owner makes to increase performance are generally unwise. Changing the engine speed adjustment to make the tractor travel faster may seriously shorten the life of the engine, without appreciably improving production. Tampering with the fuel injection pump adjustment, if the engine is a diesel, may give the engine more power; but at the same time this additional power may be more than the balance of the tractor is designed to handle safely. A "hands off" policy is best.

4. *Tightening of loose nuts and bolts and minor replacements.*

A fortune awaits the man who will provide the world with a cheap means for locking capscrews, bolts and nuts securely against vibration and yet permit removal without regard to the locking mechanism. The lockwasher is the best answer found so far, but it has its limitations. The continual shock and vibration of an operating track-type tractor may overcome the lockwasher and allow the capscrew or nut to loosen.

Maintenance men who make a regular practice of going over the tractor periodically, testing and tightening all exposed nuts and capscrews find the time thus spent is well rewarded in reduced maintenance and repair expense.

The above suggestions and recommendations are, of necessity, rather general. For information of a more specific nature, the tractor owner should first consult the instruction book furnished with the machine. If his problems of operation or maintenance are of a specialized or extraordinary nature, his best source of help is the tractor dealer from whom the equipment was originally obtained. The dealer has a natural interest in maintaining the reputation of the equipment he sells and is always glad to do everything possible to assure maximum satisfaction.

GENERAL CRUSHED STONE CO. SAFETY PROGRAM PROVES HIGHLY SUCCESSFUL

By H. F. YOTTER
General Crushed Stone Co.

THE plan of accident prevention and self-insurance of our company was conceived and instituted by its management, and ever since it has had the full support of our executive and operating heads. Management must lead the way in accident prevention and in a manner that the workers will be convinced of its sincerity. The employer is morally obligated to see that his employees are enlightened as to the hazards of their occupation and to make sure that they are active in their efforts to avoid accidents. Existing dangerous conditions must be corrected and made safe before we can reasonably expect the cooperation of the employees in our efforts to reduce accidents. Suggestions from workers as to safety should be encouraged. In this manner their interest will be increased and their initiative stimulated. Human beings respond to nothing so completely as mutual confidence. Accident prevention is an essential part and an inevitable result of good management. It is so closely linked with other problems of management that effective effort in one will likewise affect the other.

A Working Plan

In our company we have a General Safety Committee composed of the executive and operating heads of the company, whose function it is to direct and plan our program of safety. The policies of this committee are transmitted to the plant superintendents and local safety committees through the medium of the safety supervisor, who regularly and frequently visits each plant. We have at each operation a safety committee made up of five or six of the key men and the local superintendent. This committee meets periodically with the safety supervisor, who presides at the meetings.

At these meetings is reviewed the accident experience of all of our plants since the previous meeting. We have in effect an inspection report form covering some of the principal conditions at the operation, which is used by the local committee in making its inspection of existing conditions. On these forms are recorded the result of the inspections and the ideas and recommendations of the members of the committee, and such suggestions are passed on at the committee meetings. General matters of safety are discussed, and the members of the committee are expected to present suggestions with respect to unsafe conditions and the safety and health of the workers. Such ideas as are developed at these meetings are then passed on to the other workers by this representative committee.

The prevention of accidents is made the responsibility of the superintendent, just as he is held accountable for quantity, quality and cost of production, since safety bears a close relation to each of these operating phases. When the superintendent is convinced of the value of safety and is enthusiastic about preventing the men under his supervision from being hurt, considerable progress has been made in the program. If the superintendent is an effective leader and holds the respect of the men, as is very necessary, he is placed in an excellent position to influence his men to acquire the habit of working carefully and in a manner which will prevent their being hurt. If the superintendent is held in high esteem by those in his charge, they will look up to him, and the confidence thus established will simplify and facilitate his work of educating them in safemindedness. Safety engineering is really human engineering, and the best results can only be attained if the superintendent in charge can procure the sympathetic cooperation of every man at his plant.

Implications of a Safety Program

A careful study of working conditions, a thorough analysis of accidents occurring under them, and a searching inquiry into potential causes of accidents afford an accurate picture of the hazards to which workmen are exposed and permit determination of the proper means of forestalling or overcoming them. No remedy can be effective which is based upon a wrong diagnosis.

Safety means getting every man on the job to look his ground over in advance. Workers should become imbued with the safety habit. Each man must come to realize that hazards do exist in our industries, that he and his fellow-workmen are exposed to them, and that it is highly important that he habitually exercise caution if he and others are to avoid injury.

Practical Results

A number of our plants have in the past set up enviable records in accident prevention. We not infrequently have plants setting up no-lost-time records of two to four years. One of our quarries, that located at White Haven, Pa., has experienced no accident involving the loss of time for the last 117 consecutive months. During this time that operation put in over 700,000 man-hours.

Our company assumed its own compensation risk through authorized and approved self-insurance in two states about eighteen years ago and has operated in this manner ever since. During this time we have carried excess insurance as a protection against any exceptionally heavy potential loss due to a disastrous occurrence. In the very nature of our business, we handle large quantities of explosives; and from this standpoint alone it will be realized that the possibility of a serious mishap exists.

As the result of the carrying of our own compensation risk, we have effected a considerable saving over what purchased coverage would have cost us. Besides the financial saving thus effected, we believe that our own administration of our workmen's compensation has fostered a closer relationship between the company and its employees through the personal contact in the handling of compensation matters and the more intimate relation in following up injury cases among our men. This contact with the injured men by a representative of our company, rather than by an outside party, who is a stranger to the claimant, we believe tends toward a better understanding between employer and employee, largely through the greater personal interest shown and the probably more liberal expenditure for medical, surgical and hospital services, which may result in the quicker rehabilitation of the injured employee and his consequent earlier return to work.

The lower morale of workers as the result of the uncertainty and tenseness created by the war presented an additional problem in our industry. The manpower shortage

(*Continued on page 80*)

Methods Employed in Hydration And Slaking of Lime

By W. R. CLIFFE
Consulting Engineer

another P AND Q exclusive

PRIMITIVE man's discovery of the fact that certain types of stones were changed by heating, and his later discovery of applications for the material so obtained are shrouded in the mists of antiquity.

While it is impossible to know of the prehistoric uses of lime it seems probable that long before primitive man left his cave for a hut or took to the cultivation of fields, lime played a useful role in his life in connection with the removal of hair from the skins of animals.

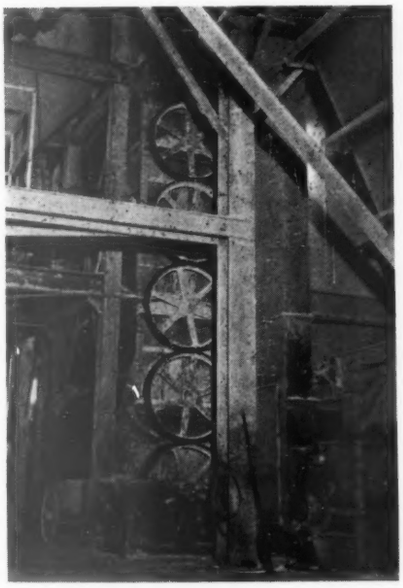
It is certain that the use of lime in making mortars and plasters was an early discovery. It is equally certain that developments in this field were extremely slow. The forming of a dam of mixed lime and sand, the addition of water, and the working of the mortar was probably as common a sight hundreds of years ago as it was within our own memory.

The development of agriculture and of an early understanding of soil technology was accompanied by the use of lime in the correction of soil acidity. Thrifty farmers burned stone in their own kilns and limed their fields with the home-burned product. In the absence of chemical tests much of the time and effort so expended was wasted on low-grade stone which was of little value on the fields, but nevertheless the practice was general.

And so, in retrospect it appears probable that the production of lime constituted the first chemical industry. And, as in many other old industries, much has been, and still is, taken for granted in connection with lime. Meanwhile, younger industries, based on more exact scientific principles, have taken the spotlight, but lime remains a great basic business in spite of lack of progress because it is the most widely distributed, most abundant, and cheapest alkali available.

While the average layman customarily thinks of lime—if he thinks of it at all—in connection with agriculture, construction, or the time-honored method for the disposal of the *corpus delicti* in murder mysteries, he is unaware of its importance in the steel, paper, sugar, glass, paint, oil, and other industries, and is little interested in the great contribution which lime makes in his everyday existence.

But lack of public knowledge and interest has not prevented the continued growth of the lime industry. The rapid development of the scientific approach to industrial problems which has characterized the past fifty years has had a definite effect. The qualities demanded in lime have been more and more closely specified both as to physical and chemical analysis.



Modern continuous-type hydrator preceded by hammermill.

Caustic lime, the form in which all lime reached the consumer until recent years, while having a high percentage of effective oxides, has many undesirable qualities. Its tendency to absorb water from the atmosphere makes it hard to handle and difficult to store satisfactorily because of the generation of heat and the physical expansion accompanying the reaction. Furthermore, the tendency to recarbonation by combining with the carbon dioxide in the air offered a continuing problem although one of less magnitude than that mentioned above.

In addition to the inconvenience of handling there was always the difficulty of further processing "on the job" to be considered. In most instances the quick lime had to be slaked and slaking was a process subject to many variables, some of them inherent in the lime itself, others in the methods used.

Therefore it was only natural that steps should be taken to obtain a product which was free from the undesirable characteristics of quick lime. This product was hydrated lime, an apparently dry powder formed by the addition of just enough water to change its chemical composition but not enough to make it sticky or wet. This new product had the advantage of being relatively inert and readily controllable. On the other hand, certain disadvantages were inherent in the new product, the chief ones being those of lower oxide availability, higher production cost, and the cost of bags. Consumers of hydrated lime paid not only for processing and bagging the caustic lime but also for the cost of transporting the added water, and pound for pound, the hydrate offered only about 75 per cent. of the oxide availability of the quick lime.

Nevertheless, the hydrating of lime is an increasingly important process although there is a growing tendency for the consumer to perform the hydration himself in order to take advantage of the lower cost of transportation. Where this practice is in vogue a hydrator is installed as an integral unit in the plant where the lime is to be used. In instances where milk of lime or slaked lime is required a slaker is installed in the same way to accomplish a similar purpose.

Hydration Of Lime The term "hydration" refers to the mixing of lime (CaO) and water (H_2O) in the proper proportion to complete the chemical reaction

$$CaO + H_2O = Ca(OH)_2$$

and to produce a seemingly dry, powdery chemical known as a hydroxide (hydrated lime). We say "seemingly dry" because, in addition to the chemically combined water in the hydrate, a small percentage of uncombined moisture is sometimes present, although it exists in quantities too slight to be apparent except by analysis.

The formula weights of the compounds involved in the reaction are: $CaO = 56.08$, $H_2O = 18.02$, $Ca(OH)_2 = 74.10$. On a laboratory basis, operating with chemically pure lime, it is therefore apparent that the mixing of 56.08 pounds of lime with 18.02 pounds of water will produce 74.10 pounds of hydrate.

Reducing these figures to the basis

of 100 pounds of hydrate we find that 75.7 pounds of lime plus 24.3 pounds of water will theoretically produce 100 pounds of hydrate. The oxide availability of the hydrate is thus fixed at a theoretical limit of 75.7 per cent.

In actual practice the amount of water required to produce a dry hydrate is considerably less than the theoretical. The variation is due to a number of factors some of which are impurities in the lime, underburning, overburning, water lost in steam resulting from heat of hydration, incomplete hydration, and temperature variations.

The presence of these variables makes careful observation imperative throughout the hydration process if satisfactory results are to be obtained. The addition of too much water will produce a sticky hydrate, of too little water will result in incomplete hydration and the continued presence of quick lime in the product. Either variation results in an unsatisfactory product and must be avoided.

Slaking Of Lime "Slaking" refers to a process which might well be termed "over hydration". It is accomplished by hydrating lime with an excess of water to produce a mixture of $Ca(OH)_2$ and water. Similar results may be accomplished by adding water to hydrated lime. The product is variously known as slaked lime, lime slurry, milk of lime, and so on. It is obvious that the increased quantity of water involved further reduces the available oxides per pound of product. Since milk of lime is usually produced at or near the site where it is to be used, and since the features of pumpability, mixability, suspendability, rapid diffusion in large liquid bodies, and accurately-controlled availability of small quantities of active oxides are important considerations in a great many connections, the product in slaked form is in wide use in the greater number of industries using lime in their processes.

Although the remainder of this paper will be devoted to hydration, it should be understood that whatever is said concerning hydration is equally true of the slaking process. The only difference between the two is the quality of water used.

Chemical Properties Of Lime The figures on the hydration of lime given above were based on chemically pure calcium oxide. It is a well known fact that stone of a purity to produce such an oxide is not available commercially. Stone showing an analysis of 97 per cent. $CaCo_3$ is considered excellent. Assuming that the remaining 3 per cent. is comprised of impurities of the metallic oxide and silicon groups, the lime resulting from calcining one hundred pounds of this stone will contain $.97 \times .56 =$ 54.4 pounds of CaO and 3.0 pounds of impurities unchanged by calcining. Thus, the lime is seen to be 94.7 per cent. CaO and 5.3 per cent. impurities.

Furthermore, these impurities will not assimilate water during the hydration process and their physical distribution throughout the mass may also affect the affinity of the oxide for water. Many other factors such as the quality of the burn, sizing of the particle of caustic lime, and so on, also affect the chemical reaction. And so it is clear that it is extremely difficult to determine in advance the exact amount of water which will give best results in the hydrator. The difficulties attendant upon physical variation in the quick lime will be discussed in the next section.

Physical Properties Of Lime The chemical properties of any limestone are readily determinable and proper burning can make the most of them. Improper burning can affect the physical properties of even the best material to such an extent that it becomes very difficult to hydrate properly. While proper burning cannot make good lime from low-grade stone, improper burning can make low-grade lime from good stone, at least from the point of view of its hydrating properties.

If it were possible to obtain perfectly-pure limestone the dangers of overburning could be lessened. The major source of trouble in this connection derives from the impurities in the raw material which tend to fuse at the temperatures encountered. In the absence of such impurities, the melting point of CaO being 5,162 deg. F., the danger of fusion would be eliminated and all lime would be soft burned. But, as was pointed out earlier, impurities are always present in varying degrees and the danger of overburning is always present.

It is a well known fact that the dimensions of a limestone particle remain virtually unchanged under calcination. Yet some 44 per cent. of the weight of the particle is given up as CO_2 during the heating. It therefore follows that the particle of lime produced has a much greater porosity than the stone from which it was made. In the case of a soft-burned lime this porosity makes a large lime surface available for contact with water during the early stages of hydration. Under such conditions the rapidity of reaction is very great since water-to-lime contact is of the highest order obtainable.

Where overburning of the particle has occurred, the porosity of the surface is decreased by the tendency to fusion on the part of the impurities and the water of hydration fails to distribute itself throughout the interior of the particle at a rate equal to that at which it could be assimilated. Thus we find that hard-burned lime is slower slaking than the mild burned product. Many other factors may further complicate the picture but since the above explanation is essentially correct it is felt that no further discussion of this point is necessary in a paper on hydration.

In the case of underburning there is a core of $CaCO_3$ near the center of the lime particle which is not only unavailable for hydration but which also occludes the free passage of water throughout the particle during hydration. When a core-carrying particle has been overburned on the outside a combination of the results outlined above occurs.

Hammer Milling To improve the intimacy of contact between the lime and water, bearing in mind the ever presence of over and under burn, it is advisable to reduce the size of the lime particles to a predetermined minimum before feeding to the hydrator. The minimum size is a matter of individual choice, but it is felt that all lime should be reduced to at least minus ½ inch. The necessary crushing can be performed by a small hammer-mill installed ahead of the hydrator.

In this connection it should be noted that surface area varies inversely as particle size. The smaller the sizing the greater the resulting surface area of lime available for contact with water. On the other hand, it is well known that crushing to small sizes is an expensive process and it is felt that the minus ½ inch recommended above represents a good size from the point of view of both economy and efficiency.

Pug Milling To prevent the occlusion of the interior of the lime particle by an outside coating and to insure the greatest possible intimacy of contact between water and lime, a pug mill

may well be installed immediately ahead of the hydrator.

The pug mill utilizes the violence of the initial water-lime contact to promote expanding and accelerated reaction. Lime and water are admitted to the closed chamber of the pug mill and are subjected to violent rubbing, beating, and mixing action in which the particles are broken up as hydration progresses and then are thus brought into the most intimate possible contact with the water. The steam and heat generated by the reaction are utilized at least partially in the promotion of the reaction.

Following the initial violent reaction in the pug mill the material is more or less gently mixed and rubbed until the reaction is completed. In this stage the time factor is of great importance.

Pre-Hydration In order to promote and maintain high reaction temperatures in the early stages of hydration, some operators advocate pre-hydration with a deficiency of water. When this practice is employed, the procedure is exactly the same as that above except that faster temperature rise and possibly higher temperatures are experienced. After the partially-hydrated lime passes out of the pug mill, the additional water necessary for complete hydration is admitted and hydration is completed as described above.

Partial Hydration Some operators prefer to take advantage of the initial heat of reaction by the process of partial hydration. As in the case of pre-hydration a deficiency of water is admitted to the lime and thoroughly mixed with it. However, at this point, instead of completing the hydration, the partially-hydrated lime is passed to a curing bin where it is temporarily stored. In the curing bin the heat of reaction and the presence of the moisture tend to produce a slow hydration or curing of the mixture. After a suitable period of time has elapsed the material is withdrawn from the bin and sufficient water is added to carry the hydration process to completion.

The chief difficulty inherent in this type of operation lies in the possibility that a deficiency of water may provide only for the hydration of the external surface of the lime particle. Where this condition occurs difficulty may be encountered in completing the hydration process because the interior of the particle is not accessible, and, as a result, the product may contain a troublesome proportion of free oxides.

The necessity for such treatment usually occurs in plants where overburning of the lime in calcination is an accepted fact and, rather than attempt corrective measures at the source, the extended time factor theory is employed.

The Raw Material The raw material fed to the hydrator in the operation of a commercial lime plant is subject to wide variation depending upon the type of lime and operation.

Approximately 80 per cent. of the high-calcium lime produced is consumed in chemical and metallurgical industries. About three-quarters of the remainder is used in the agricultural field and the balance in building and miscellaneous applications. The high percentage of chemical-grade lime consumed by industry tends to reduce the seasonal variation in sales and also requires the careful segregation of the best lime ahead of the hydrator.

Thus, in the field of high-calcium lime the hydrator feed normally consists of the lowest grade of kiln output. It is customary in this type of operation to remove the finest lime in a first segregation, a slightly poorer grade in a second segregation, and to leave the fines and dust to be fed to the hydrator. This material, having been more or less immobilized in the core of the charge, is often underburned, carries core, and has many other undesirable characteristics.

The production of hydrate from such raw material involves two very apparent problems—(1) The recovery of the greatest possible amount of hydrate, and (2) the elimination of undesirable materials.

The successful solution of the first is accomplished by hydration accompanied by gentle friction on the lime particles, friction great enough to remove all the lime from the core but not great enough to crush the core or reduce it to a fineness comparable to that of the hydrate.

The second problem is solved by air separation of the finished hydrate. Since the light, fluffy, finely-divided hydrate does not lend itself to screening, air separation offers the best solution to the problem. In this process all oversize particles, and particles of density inconsistent with the hydrate are rejected and the hydrate is passed to the storage bins in a uniform and relatively uncontaminated condition.

In the dolomitic-lime field the situation with respect to consumption of the product is practically reversed. The great majority of the lime is consumed by the building trades and agriculture, with smaller quantities being devoted to glass making and other industries. Under such conditions the entire production of the kilns reaches the hydrator or, if there is any segregation, its purpose is to remove the poor-quality lime before hydrating the best.

In spite of this difference in selection there is no essential difference in the process of hydration. In the final separation of hydrate destined for the building trades coarser sizes are the rule and this phase of operation is less expensive than is the case where high-calcium lime is being classified. It is a well known fact that the achievement of fineness of product is expensive and that both original equipment costs and operating expense are involved.

Still a third variation in the raw material must be considered since many of the industrial plants consuming high-calcium lime purchase the best grade of lime from the commercial producers and hydrate or slake it at the plant site. While the process is essentially the same as that outlined above, the use of high-quality lime results in high temperatures, almost explosive violence in the initial reaction with water, and a comparatively low volume of tailings or rejects at the time of classification. It is, of course, true that close specification on the raw material is reflected in the quality of the finished product.

Since the majority of industrial consumers use the slaking process rather than that of hydration, it should be noted that wet screening of the product to obtain the required size is normal practice. The difficulties encountered in screening the dry, fluffy hydrate disappear in the presence of an excess of water.

Pressure Hydration It has long been known that the hydrating properties of magnesium oxide were much different from those of calcium oxide and that the process of normal hydration of dolomitic lime fails to affect, to any great degree, the magnesium oxide contained therein. It is also known that the factors of temperature, pressure, time, and water ratio have an effect on the hydration of magnesium. Experiments have proved that an increase in plasticity results from increased hydration of the magnesium, and assuming the desirability of this increase in plasticity, considerable time and effort has been expended on the promotion of the pressure hydration of dolomitic lime.

It is becoming increasingly apparent that the question of the desirability of pressure hydration is not settled. While high plasticity is desirable from the point of view of the trowel trades, it is equally true that plasticities above 350 Emley have an adverse effect on dolomitic lime used in plastering. Thus acceptance of the desirability of pressure hydration is far from universal even though certain building codes have gone so far as to specify the use of pressure-hydrated lime in structures erected within their jurisdiction.

Much remains to be done before the question of pressure hydration is settled and its place in the lime industry becomes relatively stable.

Anhydrous Lime Powder Another recent development in the industry is that of anhydrous lime powder, a product of the further treatment of hydrated lime. Patents covering the production of this material claim for it approximately the properties of hydrated lime in combination with an available-oxides-ratio approximately equivalent to that of quick lime. Thus, one of the major handicaps of hydrate—the presence of a large percentage of water—is overcome, and yet the chief drawbacks of quick lime—swelling on contact with moisture and the generation of high temperature—are also reputedly absent. This new product holds much promise.

Further Steps While the impact of science in industry has necessarily been transmitted to the commercial production of lime, it is our opinion that its full significance has not yet been recognized.

As was pointed out earlier, the production of lime is an ancient industry. Many of the present practices are subject to improvement. Many questions remain unanswered, not because they are unanswerable, but because the industry as a whole has been too busy making lime to conduct parallel experiments.

In the field of lime hydration many questions remain unanswered and open the way to experimentation. The question of ideal pressures and temperatures for pressure hydration, the question of utilization of the heat and steam generated in the process of normal hydration, the questions of the effect of pre-hydration and partial hydration on the quality of the product, and the question of the value of the application of externally-supplied heat, are all important and still unanswered.

Premiums in price and an edge in the competition for post-war markets are waiting for those who find the correct answers.

General Crushed Stone

(*from page 76*)

existing during the last few years has resulted in greater labor turnover, and it has been necessary to employ some men of lower caliber and poorer physical condition than heretofore. This type of worker has presented a serious difficulty. Many of these men are so-called "drifters" and require greater direction, as they have not worked sufficiently long at one location to have absorbed much safety training. Their poorer physical condition and, in some cases, their advanced age also constitute added hazards; and it is essential that much care be exercised in placing them in jobs where their physical and mental handicaps will expose them to the minimum risk.

In conclusion, we feel that the reduction of accidents in our company has been the result of the sincere and continued interest of our executives and the careful planning of our accident prevention work.

Gravel Producer

(*from page 68*)

to a pair of Butler bins each with four 50-cu.-yd. aggregate and two 150-bbl. cement compartments. Under both bins are Butler weigh batchers, one of 2-cu. yd. and the other of 6-cu. yd. capacity. The former will be used for loading loose material or for dry-batching into dealers' batch trucks. The latter will be used for loading ready-mixed-concrete truck mixers.

Each terminal will have two 400-c.f.m. Chicago Pneumatic compressors and two 125-hp. forced draft boilers which will supply steam for winter operation.

The general layout of the new system and the plants was designed by H. F. Garvin Pelsue, formerly vice president and general manager, who has been president of the company since October, 1945. Joseph H. Dixey is supervising the detailed design and the construction for the company. The company's forces are doing all the construction except the plumbing and electrical work, the building of the docks, and the dredging of channels to them.

Unique Methods

(*from page 72*)

after a rainfall, and consequently no provisions have been made, or will be made, for stockpiling. During the producing season, from early in March to December, the plant will ship about 10 cars per day.

Approved lime vendors in the various counties purchase the material from the State Lime Commission, selling to farmers at established prices. The state has gone into the lime business solely for the purpose of establishing a vitally-needed industry, and when this objective has been accomplished the intention is to sell the properties to private operators.

Chairman of the Mississippi State Lime Board is the Honorable Thomas Bailey, governor of the state. Other members are: T. I. Jones, Director of the State Extension Department, Dr. Clarence Dorman, Director of the Experiment Station, Si Corley, State Commissioner of Agriculture, and F. J. Russell, chief maintenance engineer of the State Highway Department. Col. John W. Thames is manager at Cedar Bluff.

A 2-shank rooter, drawn by a tractor, is used to root out or "harvest" the slab-shaped rocks.

MISSOURI RIVER SAND AND GRAVEL CO. FEATURES SYSTEMATIC CABLE INSPECTION

THE first operations of the Missouri River Sand & Gravel Co. of Boonville, Mo., which is 75 years old, were entirely by hand. The sand was loaded from open bars in the Missouri River onto small flat boats which were pulled up the bank to the main pile, where the boat was unloaded across a bank plank by wheelbarrow.

In 1905 we put in our first stationary steam crane. This made a big difference in speed and the amount of sand we could deliver from the boat to our stock pile.

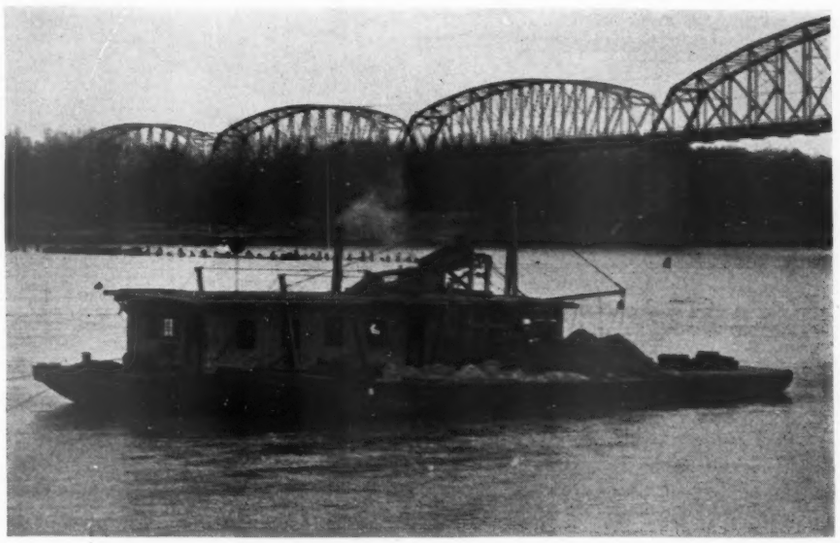
Today we have a large floating dredge operated with a 75-hp., 4-cylinder diesel engine. This dredge goes out over the bed, lets down an 8-inch suction pipe, and the sand is pumped onto the dredge over a 4- by 9-foot screen with 3/8-inch openings.

After passing through the screen the sand is washed by a "classifier", which removes the silt and other foreign substances such as lignite, small pieces of wood, etc.

From the dredge the sand is carried by conveyor belt to a 150-ton barge. These barges, when loaded, are towed by a gasoline tug to our river-bank plant.

We use a steam derrick equipped with preformed cable for unloading the barges at the plant. From the stock pile, this same derrick loads the sand into freight cars or a hopper for reloading trucks.

On our derrick-crane we use 320 feet of 3/4-inch preformed wire rope. The bucket is a 1 3/4-cubic-yard unit and the crane is an American.



Dredge operated by the Missouri River Sand & Gravel Co., Boonville, Mo., loading sand on a barge. Note the two cables at the left end of the dredge.

The dredge is swung out into the river over the sand bar by two 1,000-foot 7/8-inch preformed cables. One of these cables is fastened to a guy on the bank, the other to a concrete anchor weighing 4 tons, which is dropped into the river.

By S. C. VAUGHAN
Missouri River Sand & Gravel Co.

Two years ago we changed from non-preformed cable to the preformed type for the derrick-crane operation. When these ropes were retired, we used them, spliced, on the dredge operation. We found that even badly-worn preformed cables did not barb or cause prongs to protrude. The broken wires remained in the same position as when the cable was new. This feature made the once-used cables safe for the men to handle on the dredge. Before changing to preformed we always sold our retired cables (from the derrick) for junk. This safe second use for our wire ropes has been quite a saving to us and more than offsets any additional initial cost of the preformed rope.

On the average we change ropes on the derrick-crane once each six months. We could probably get a slightly longer safe life from these ropes, but we figure that we gain on the second use enough to play absolutely safe on the derrick-crane ropes.

For the last four years we have been building up sheave grooves and drum surfaces with hard metal welding. The sand cuts these away, and unless replacements are made, or repair work is done, a rope is damaged much sooner than in cases where sand is not a factor.

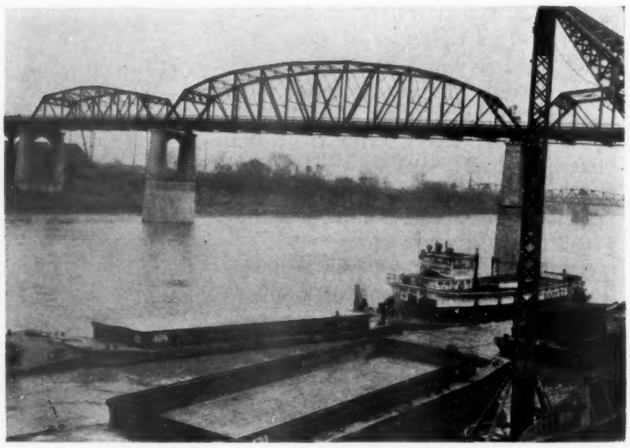
While we clean and inspect our cables regularly, we do not treat them with a fresh lubricant. We have found that each application of a lubricant increases the sand grind on the sheaves and drums. I have had a good many arguments with operators regarding this, but none of them have changed our policy of not treating our derrick-crane

(*Continued on page 83*)

Left: The derrick crane loading sand from the stock pile at the plant on railroad cars. Right: Sand being loaded into the hopper, which later discharges it into trucks.

Tennessee Firm's Use of Concentrating Tables Pays Big Dividends

By WILLIAM M. AVERY



Left: Specification sand and gravel can be produced on the diesel-electric dredge "Herbert," converted by T. L. Herbert & Sons, Nashville, Tenn., from clam shell to suction operation. Right; The towboat "Harvey" easing in a string of loaded barges.

another ON THE SPOT report

SOME 12 years ago T. L. Herbert & Sons of Nashville, Tennessee, pioneered the use of concentrating tables for cleaning sand and gravel. The installation was described in considerable detail in the December, 1934, issue of PIT AND QUARRY—so soon after the operation had begun that no broad, significant conclusions could be drawn concerning its success.

The company's problem was to remove the organic matter, coal, coke and other industrial waste products associated with the sand and gravel deposits in the Cumberland River. Drag boxes, jigs, screws and settling tanks had been used at various times with only a fair degree of success. With all of these methods it was found necessary to observe the greatest care in selecting the dredging areas in order to throw as little strain as possible on the cleaning capacity of the plant. This practice necessitated long hauls and caused periodic interruptions in production while suitably clean deposits were being located.

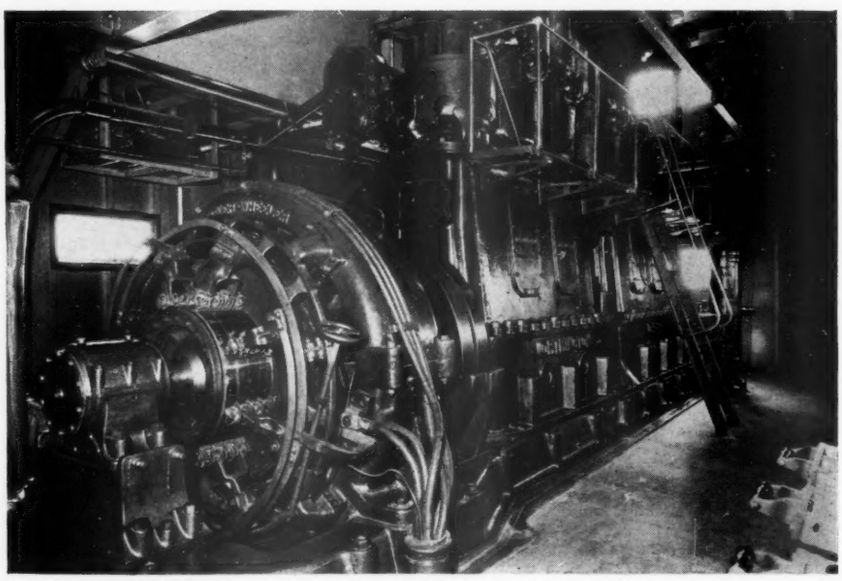
Seven Deister-Overstrom diagonal-deck tables are used in the washing operation—5 for gravel and 2 for sand. The decks, which measure 7 feet 10 inches wide by 17 feet long, are divided by transverse partitions, each half-deck having an end elevation and side tilt which cause the water and material to run from the feed corner diagonally across to the opposite corner. Dressing water, supplied from a water box along the feed side, flows across the riffles, stratifies the feed and carries refuse materials or tailings off to the side of the table in the order of their specific gravities. Guided by the rubber riffles, the heavier materials—sand or gravel, depending upon the feed—are carried to the concentrate end and discharged. No attempt is made to accomplish size separation on the tables.

Regardless of the percentage of impurities in the plant feed, a uniformly-clean material has been produced since the concentrating tables were placed in operation 12 years ago. Briquettes made with the sand product have tested 8 to 20 per cent. stronger than briquettes made with standard Ottawa sand. The original tables are still in operation.

The company's diesel-electric dredge, the *Herbert,* was remodeled in 1940 to change from clam-shell to suction recovery. The hull has an overall length of 126 feet, a beam of 26 feet and a draft of 4½ feet. Power for the 10-inch Amsco dredge pump is furnished by a 450-hp. Worthington diesel engine which drives a Crocker-Wheeler generator. Barges are towed to the plant site—on the south bank of the Cumberland River about a mile from downtown Nashville—by the diesel-engine tow boat *Harvey.* Fourteen barges of about 400 tons capacity are in service.

Although specification sand and gravel can be produced on the dredge, all the material for the company's extensive ready-mixed concrete operations goes through the

The 450-hp. diesel engine and generator on the "Herbert".



washing plant. Three sizes of gravel are separated on the dredge by means of a 6- by 20-foot Allis-Chalmers rotary screen. A 6- by 19½-foot stationary screen is used for producing masonry sand. An Austin-

The batching plant and one of the 3-cu-yd. mixer trucks.

Western 20-inch roll crusher has been installed on the *Herbert* to increase the percentage of material passing 100 mesh. About 10 per cent. of crushed material is added to the sand. Although the company can produce up to 10,000 tons of aggregates per week, production averages around 30,000 tons per month, a large share of which is consumed in the firm's own ready-mix concrete operations.

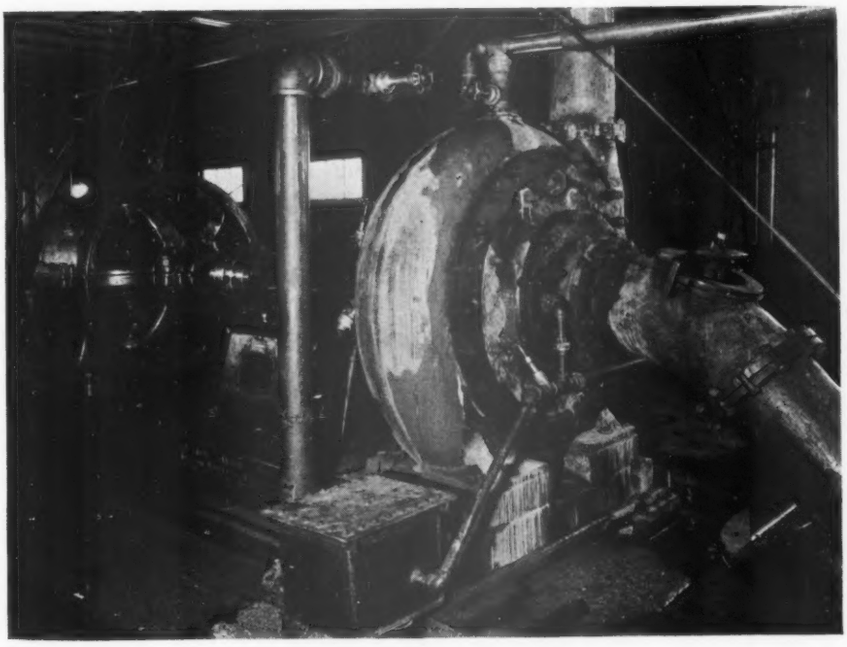
At the time it was built in 1931, T. L. Herbert's central-mixing plant was one of the outstanding operations in the field, and was one of the relatively few plants instantly convertible from central-mixing to dry-batching operations. This plant was completely described in the July 27, 1932, issue of PIT AND QUARRY. There are nine bins over the Rex 3-cu.-yd. mixer—two for sand, four for gravel and three for cement. The plant was built by the C. S. Johnson Co. Sixteen mixer trucks are in operation—13 Rex and three Jaeger—and all have a capacity of 3 cubic yards. Under pressure the firm has delivered as much as 670 cubic yards of concrete in a 12-hour day. The company was one of the first to equip its trucks with the Heil Jackass hoist,

On the concentrator tables impurities pass over the tailings side into a chute and are flumed a distance of 900 ft. back into the river. The washed material follows the riffles to the concentrate end, where it is discharged into launders.

which raises the rear end of the body when discharging.

The company is now operated by the three sons of T. L. Herbert, who organized the business some 40 years ago. They are: John S. Herbert, president; T. L. Herbert, Jr., vice-president and general manager; and R. D. Herbert, secretary-treasurer. In addition to the plant at Nashville, the company carries on operations at Johnsonville, Tennessee, and Louisville, Kentucky, under the name of Sangravel Company, Inc.

A view of the 10-in. dredge pump on the "Herbert".



Issue Reference Book On Cement Technology

One of the forthcoming engineering books of the Chemical Publishing Co. is *Portland Cement Technology,* by J. C. Witt. It is described as a practical text and reference book for all technical and non-technical men interested in the cement, concrete, and allied industries. Mr. Witt traces cement technology from its rudimentary stages to its present highly scientific status. The treatment of the various chapters is based primarily on materials rather than on plant equipment.

The author has drawn from his published papers, unpublished manuscripts, notes and calculations and the existing literature on Portland cement. The book succeeds R. K. Meade's *Portland Cement,* now out of print. It is based on the author's years of study and research prospecting in raw materials, and on his experience in plant operation, engineering, development, consultation and administration. Each chapter has been reviewed by a specialist on some phase of the subject matter.

The contents include the following topics: History of the Cement Industry; Raw Materials; Proportioning Raw Materials; Preparing the Raw Mix; Fuels; Clinkering; Power; Grinding the Clinker; Storing, Packing, Loading and Shipping; Plant Design; Experimental Engineering; The Nature of Cement; Analyses and Tests; Concrete Materials; Proportioning Concrete Materials; Concrete Technology; Miscellany.

Mr. Witt is a graduate in mechanical engineering at Armour Institute of Technology. He is a fellow of the American Society of Mechanical Engineers and a member of the American Society of Civil Engineers.

Missouri Sand

(from page 81)

cables with a dressing.

Our sand operation is carried on with five full-time employees. A hoist engineer and a fireman are at the plant for unloading the sand from the barges and loading it into railroad cars and into the hopper for trucks. At the dredge we have a dredge engineer and one deck hand. These two men also handle the barges and the small tug which brings the barges from the dredge to the plant when they are loaded with sand.

World's Largest Asphalt Paving Job In Progress at Eglin Field, Florida

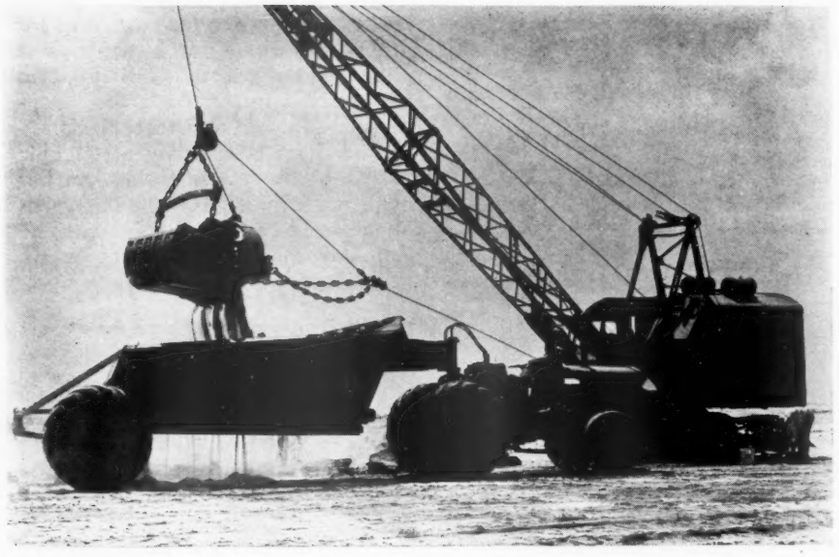
another ON THE SPOT report

THE largest asphalt paving contract ever undertaken is nearing completion at Eglin Field Army Air Force Proving Ground, near Fort Walton, Florida. The contract, involving 1,800,000 cubic yards of excavation in addition to the place-

By WILLIAM M. AVERY

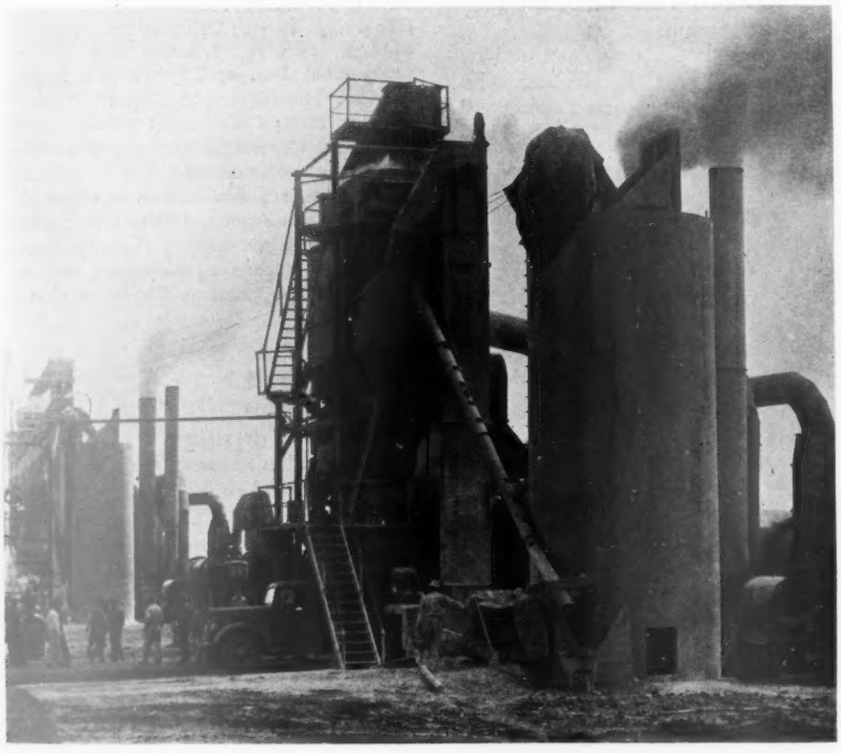
ment of 332,500 tons of bituminous concrete, is held by the Noonan Construction Company and the Smith Engineering & Construction Company of Pensacola, Florida. Two Simplicity System Model S-75 asphalt plants are producing hot-mix material for this project at the rate of 2,800 tons per 10-hour day.

The contract calls for the construction of a main north-south runway 10,000 feet long and 300 feet wide, flanked by a parallel taxiway of the same length and 100 feet wide. The two pavements, which have a clear distance of 600 feet between them, are to be connected at intervals by five 100-foot lateral taxiways, making a total area of 4,300,000 square feet of bituminous concrete pave-



A large fleet of heavy equipment was moved in to handle 1,800,000 cubic yards of excavation involved in the contract. Haulage unit pictured carries 13 cubic yards.

ment. We couldn't resist the temptation to unlimber our slide rule a bit on this almost fantastic figure. For the benefit of inveterate collectors of useless statistics, we have determined that the pavement being laid at Eglin Field would just about cover a 100-acre farm, although we would much prefer to see it used on a few golf courses of our acquaintance. It would also make a 6-inch pavement 20 feet wide and over 80 miles long, but even for highway purposes we can see much to favor the proportion used by the airport designers.

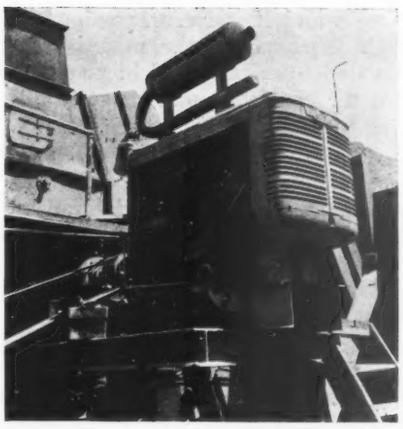


Operating side by side, two asphalt plants are producing hot-mix material for Eglin Field at rate of 2,800 tons per 10-hour day.

The Smith firm moved into Eglin Field in August, 1945, and mixing operations began on the last day of the year. For excavating and grading the sub-base, including the handling of 1,800,000 cubic yards of unclassified excavation and the removal of 500,000 square yards of existing pavements, the following heavy equipment was employed: three 13-cubic-yard Euclid Wagons, two Super C and four Model C Tournapulls, eight 15-cubic-yard LeTourneau pans, six Caterpillar D-8 bulldozers and one M-7 Caterpillar unit, Northwest No. 4 and No. 6 draglines, and a Thew-Lorain 40 dragline. In addition, two Caterpillar D-8's are used for feeding aggregates to the clamshells at the mixing plants.

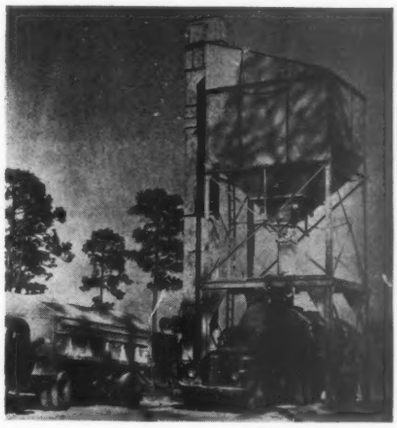
The sub-base is stabilized to a depth of three inches with an emulsion consisting of water, asphalt and soap. This material is mixed in with a Woods road mixer and compacted with pneumatic-tired rollers.

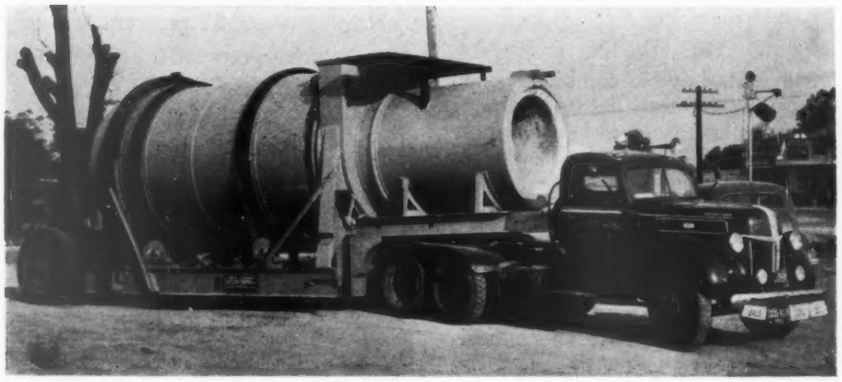
The contractor is operating two identical Simplicity System Model S-75 asphalt plants on the job site.



Each plant incorporates three 85-hp. diesel engines.

One of the mixing plants; at right, sand is being bulldozed to drag line.





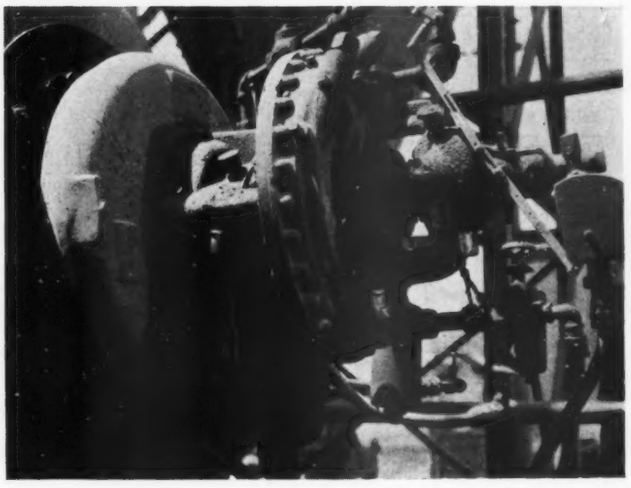
Double shell drier mounted for transport on permanent frame.

Above: Cement bin at railroad siding with 10-cu.-yd. dump truck in position for loading.

Right: Slag being transferred at Pensacola from hopper-bottom gondola to barge by conveyor belt. Trucks move it from landing point to mixing plant.

Bottom, left: Oil burners on the boilers are motor-driven to avoid the necessity of operating a boiler booster.

Right: Turbine-driven oil burners are used on the driers.



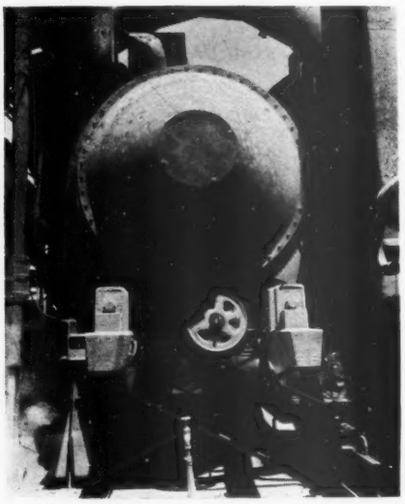
In all, 9 bulldozers of various sizes are in operation in addition to 6 motor-scraper units of the type shown at right.

These units have a combined rated capacity of 300 tons per hour. Power for each plant is furnished by three International UD-18 diesel engines which are rated at 85 horsepower each. Due to the fact that the local sand is unusually hard to dry, each plant was equipped with a Simplicity 6- by 20-foot single-shell conditioner in addition to the standard 8- by 15-foot double-shell drier. The materials are screened above the plants by Symons 4- by 12-foot double-deck vibrating screens. Ray BG-8 turbine-drive oil burners are used on the single-shell driers and BG-6 electric-drive burners to eliminate the necessity of operating a boiler booster.

The Smith Company has developed several features of its own in connection with these plants. It designed and built 110-ton portable steel silos for each plant to handle dust storage. Each silo incorporates a built-in bucket elevator for loading from a ground level hopper. A screw conveyor feeds material from the silos to the mixing plant bucket elevators.

The driers on the Model S-75 plant were designed to be shipped by rail or truck and trailer with combustion chamber and drier proper comprising two separate units. Because its operations (as in the case of the Eglin Field job) frequently go beyond the limits of rail transportation, Smith has designed and built steel trailers which carry the two units on a common frame for highway haulage. The trailers have special detachable rear wheels which are removed when the plants are assembled.

The sand specification for the asphalt base calls for 100 per cent. passing No. 4, 95 to 100 per cent. passing No. 10, 60 to 80 per cent. passing No. 40, 22 per cent. passing No. 80 and 12 per cent. passing No. 200. Fortunately, the material excavated from the air field meets all but the No. 200 requirement of this specification. The 200-mesh fraction is supplied by the addition of pulverized limestone shipped from Birmingham. Shipment is by rail to Crestview, Florida, where the material is reloaded into Heil 10-cubic-yard totally enclosed dump bodies drawn by International tractors.



Combustion chambers and drier shells are mounted on special frames for trailer haulage.

The sand and asphalt base for the pavement is put down in three 3-inch courses and topped with a 1½-binder course and a 1½-inch wearing course. The specifications require 60 per cent. slag, 36 per cent. sand and 4 per cent. mineral filler in the binder course, and 55 per cent. slag, 40 per cent. sand and 5 per cent. filler in the wearing course, with asphalt running approximately 5 per cent. of the total mix. Since there are no local sources of suitable coarse aggregate, slag is being furnished by the Birmingham Slag Company. The material is shipped in hopper-bottom gondolas to Pensacola, where it is reloaded into barges and delivered to a point about four miles from the air field. From this point it is trucked to storage piles adjacent to the mixing plants.

Bucyrus Erie 22-B and Northwest 25 clamshells feed the aggregates from the stockpiles to the plant elevators. Because of the large area covered by the storage piles, two Caterpillar D-8 bulldozers are kept operating to push material within reach of the clamshells. The slag

(*Continued on page* 89)

Boiler, cold and hot elevators, conditioning drier and dust-collecting system.

ALEXITE ENGINEERING COMPANY DEVELOPS RICH VERMICULITE DEPOSIT IN WYOMING

Versatile Micaceous Featherweight Mineral Yields Many Products

INCREASED applications and demands for exfoliated vermiculite will probably be satisfied more readily with the recent discovery of a very large deposit of vermiculite ore near Encampment, Wyo. The deposit, a 700-foot mountain, recently named Mt. Alexite, containing an estimated several million tons of ore, is being worked by the Alexite Engineering Co. of Colorado Springs, Colo. J. Don Aexander is president of the company, whose product bears the name "Alexite." It is anticipated that this deposit may prove to be the second largest in the United States.

The vermiculite ore, a natural micaceous mineral, is located by geological examinations and is found in pockets or lenses. These lenses will show from one to several characteristics as to the size of the flakes, the different degrees of purity, as well as the varying degrees of toughness. There is also a variation in color. In the operation, careful tests are made to determine the best combinations of useful characteristics.

Recovery of the ore is a strip or open-cut operation. At present a General 1-cubic-yard diesel shovel does the digging. A field exfoliator tester is maintained at the point of operation. All the ore which meets specifications, especially that which runs about 90 per cent. pure, is dumped into a jack-leg bin. That which does not come up to standard specifications is dumped down the hill-side as reject ore. The acceptable ore is discharged from the bin into dump trucks which take it to a grizzly where rocks and other large undesirable materials are screened out.

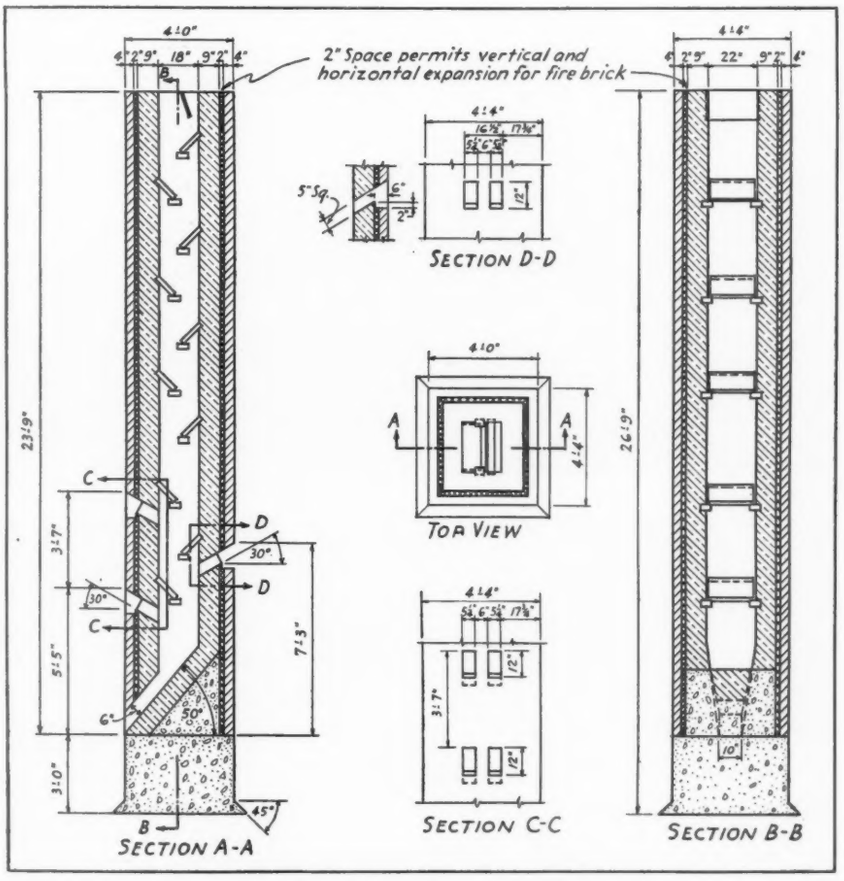
The screened ore enters an oil-heated rotary dryer which removes the surface moisture. Careful regulation is necessary during this process in order that some moisture will remain between the layers of the mica-like ore. This inter-layer moisture is essential to exfoliation; when the ore is heated to approximately 1,800 degrees F., the moisture expands into steam and is helpful in creating an accordion-like spreading of the layers. The raw ore weighs about the same as coal, but after exfoliation it weighs about 6 to 10 pounds per cubic foot, as it has expanded to about 16 times its original size.

The rotary dryer, in addition to sizing, also removes certain impurities and rejects dust or particles too fine for commercial use. After drying, the ore is screened and delivered in selected sizes, up to ½ inch, to four different loading bins, which are located down the hill from the mill site and over a railroad siding. The total distance from the mine to the siding is approximately one-fourth of a mile, and gravity chutes are employed to handle a large part of this movement.

At present, exfoliation is carried out in Colorado Springs, where the company's headquarters are located. Current plans call for exfoliation facilities at the mine, in order to reduce material handling. It is more economical to ship the ore to its market locale for exfoliation as the freight rate on processed vermiculite is increased three or four times because of the increased bulk.

Special properties of Alexite are: its high absorption (400 per cent. of its weight in water); lightness (10 per cent. of the weight of sand); complete sterility; ease of handling (non-caking, non-hardening); toughness (soft, but smooth); fire-resistance and dielectric characteristics; usefulness as a plaster mix in place of sand. The many tiny air cells in expanded Alexite account for its insulation value as a building material. The use of vermiculite as a sand substitute according to proper specifications has been approved by the A.S.T.M. Raw vermiculite ore has no known commercial value; it is only after exfoliation that it attains commercial significance.

The Alexite Engineering Co.



Exfoliater furnace used by the Alexite Engineering Co.

markets the following products: "Absorbit" floor compound; "Super-absorbit", designed for absorption of oil, water and other liquids; mineral urn filler, to replace sand in receptacles; mineral insulation, to insulate homes; mineral aggregate, to replace sand in plaster, stucco, and concrete; "Gardengro", an organic fertilizer; soil conditioner, a mineral catalyst and moisture retainer; agricultural peat moss; fireproof poultry litter; "Humagro", a vitalized organic soil treatment; "Min-Vita," a soil additive; "Nitralex", a nitrogenous soil additive; "Phosalex", a phosphorus soil additive; "Potaslex", a potash soil additive; "Sulfalex", an additive for increasing soil acidity; "Vitalex", a concentrated soil treatment; and "Blazout", a dry powder fire-extinguisher material.

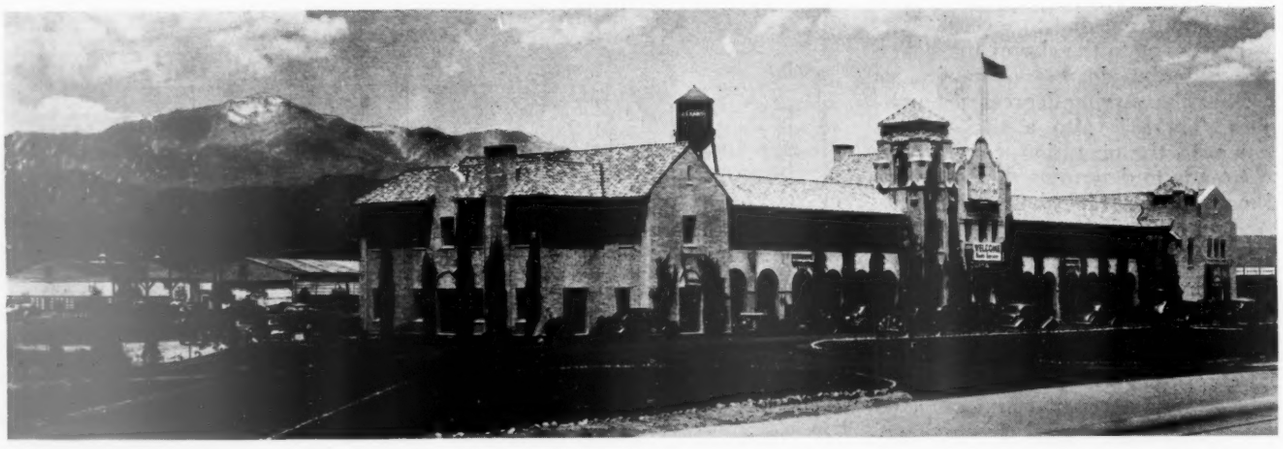
Below: The Alexite Engineering Company's main building at Colorado Springs.

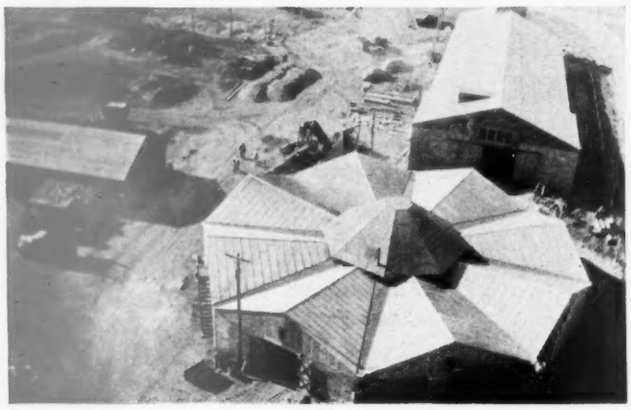
Bottom, left: The octagonal screening and drying building, where the material is stored, after processing, in the eight storage compartments. (Building in background provides additional storage space for finished material.

Bottom right: The laboratory and (foreground) a part of the maintenance building.

General view of the Alexite plant, Colorado Springs, Colo.

Equipment used at Mt. Alexite, near Encampment, Wyo., in mining Alexite.





World's Largest Asphalt Job

(*from page* 86)

and sand are fed into the driers simultaneously, then separated by screening and stored in the 4-compartment bins above each plant. The amount of each material fed to the plant is controlled to some

Truck loading at one of the mixing plants.

extent by adjusting gates ahead of the duplex feeder.

The hot-mix material is hauled from the plants to the landing strip in 6-cubic yard dump trucks. In addition to six Mack trucks owned by the Smith Company, there is in service an equal number of White trucks supplied by a local hauling contractor. Although the mixing plants are only 1,000 feet from the runway under construction, the average haul is about 1¼ miles, due to the 10,000 foot length of the strip.

With the paving work approximately 50 per cent. completed, the average output per plant per 10-hour day is running between 1,150 and 1,175 tons. Up to the present time, maximum production in a single day for both plants has been 2,935 tons. The plants are operated 5 days per week, and the usual practice is to kill the boilers on Friday night and refire on Sunday morning. Including night crews, 16 men are employed in operating each of the plants.

A breakdown of the amounts of the various mix specifications called for at Eglin Field shows the 332,500-ton total divided as follows: 250,500 tons of sand-asphalt base, 44,000 tons of binder course, and 38,000 tons of wearing course. In addition to the 210,000 tons of sand recovered from the air field and used in the sand-asphalt base, 50,000 tons of slag and 40,000 tons of mineral filler, all shipped from Birmingham, will be consumed before the contract is completed late in August of this year.

The general contract includes the pouring of 95,000 cubic yards of concrete in a parking apron adjacent to the taxiway. This portion of the work is being done by the Noonan Construction Company. The 18-inch rod-reinforcement pavement is being laid with two traveling mixers. All the pavements are designed for the 300,000 pound wheel loads created by modern heavy trasports and military planes.

F. E. Mitchell is general superintendent in charge of the work. R. J. Hammons is assistant superintendent in charge of paving operations. Grading is under the supervision of A. W. Gordon. C. W. Smith, able chief executive of the Smith Engineering & Construction Company, was elected president of the American Road Builders' Association at the organization's annual meeting in January of this year. To organizations like the Smith Engineering and Construction Company much credit is due for the development of the improved equipment which makes possible the successful performance of such difficult projects as the Eglin Field paving job.

Work on this project is a contract on a unit-price basis with the U. S. Engineer's Department, Mobile District. M. M. Boatner, Colonel, Corps of Engineers, is the District Engineer, and George T. Littlefield, Major, Corps of Engineers, is the Resident Engineer.

Sharp Upswing Predicted In 1946 Building Volume

John J. Haynes, Chief Construction Division, U.S. Department of Commerce, who was a speaker at the recent convention of Associated General Contractors of America in Chicago, stated that he anticipated a building volume which would reach a total value of $9,000,000,000 during 1946. Mr. Haynes declared that the need for rapid construction of low-cost homes for veterans "provides the most urgent of reasons . . . for the extermination of all kinds of 'feather bedding' and 'make work' restrictions" in the construction industry.

Petoskey Honors 22 at Firm's Silver Anniversary

A group of 22 employees of the Petoskey Portland Cement Co. of Petoskey, Mich., were honored on March 23 by the management at ceremonies marking the 25th anniversary of the firm's cement production. Watches were presented to the honorees, all of whom had served the company since its organization.

The Petoskey Portland Cement Co. was organized in 1917. Construction of the plant was begun in 1919, and the first barrel of cement was produced on March 23, 1921.

Need Multiple Dwellings In Vets' Housing Program

In an open letter to members of the construction industry, Thomas S. Holden, president of the F. W. Dodge Corp., quotes from a statement of Wilson W. Wyatt, United States N.H.A. chief, in an effort to "clear up misunderstandings regarding the true importance that multple dwellings will play in the current peacetime building program. The quotation is as follows:

"One of the vital requirements of the Veterans' Emergency Housing Program is housing for rent, because countless veterans will not want to buy or be in a position to do so. Therefore, multiple dwellings are a most important part of the program, and we hope that the industry will do its utmost to produce them. . . . They must be produced under our program at a price veterans can afford, or the whole objective of the program is lost. . . ."

Freight Embargo Ordered As Coal Supplies Shrink

As a result of the bituminous coal strike, the Office of Defense Transportation directed the Association of American Railroads (Car Service Division) to issue Embargo No. 237, which covers all freight shipments of one carload or less. Since agricultural limestone is not on the list of items to be exempted, permits for its shipment will be issued "only under the most impelling need." Appeals for relief from the embargo order should be addressed to W. C. Kendall, Chairman, Car Service Division, Association of American Railroads, Transportation Building, Washington 6, D. C.

Gravel Plant Craneman Plays Rescuer's Role

Robert Morton, craneman for the Morton Sand & Gravel Co. who was on duty near the Monongahela River in Washington County, Pa., recently used the company's equipment for a job somewhat foreign to his routine.

A large moving van which had run off the highway and down an embankment into the river, began floating with the current. Morton saw the sea-going truck as it passed, grappled it with a crane hook and dragged it to shore. Three passengers, none seriously injured, climbed from the cab.

THE LIME PLANT OPERATOR

BY WOLF G. BAUER

THE FLOW OF GASES THROUGH LIME KILNS (PART II)

Burners and Their Relation to Small Stone Burning

Wolf G. Bauer

BURNERS, and by this we understand devices which mix or conduct combustibles or gases for the generation and control of heat over or through a bed of material like limestone, take many forms. Type of fuel and calcining kiln influence the design.

Rather than treat and discuss in detail some of the more common type burners at this time, the writer is more interested in dealing with some of the fundamental concepts and basic principles which will allow the operator to apply such principles to his particular set of conditions of stone, fuel, and kiln.

Methods of Heating Basically we may calcine an ore like limestone or dolomite by four different techniques. (1.) By burning the fuel near but not in contact with the bed of material, and then passing the hot products of combustion gases *over* a thin material bed. Examples of this type of calcining are the Cermak-Spirek fine-ore furnace, the Scott furnace or kiln for quicksilver ore, and the various type rabble furnaces of McDougall, Herreshoff, and Wedge. (2.) By burning the fuel outside of, and then passing the hot gases *through* the bed of materials, as in the old-fashioned direct-fired shaft kilns, or as is done in the modern Ellernan-type calciner. (3.) By mixing air and combustibles and burning this mixture *over* a thin bed of ore, as is done in rotary kilns or the recent Nelson inclined stoker kiln. (4.) By mixing air and combustibles and burning them *within* a bed or column of ore, as accomplished in mixed-feed kilns or the vertical gas-fired kilns.

From a thermal efficiency standpoint there is little question that potentially, as well as in actual practice, the last method of generating and transferring heat from combustibles to the material is highest on the scale. However, as we have pointed out in preceding discussions, this heat-transfer factor alone does not always determine the over-all efficiency of a calcining sytem, nor is such efficiency necessarily the determining factor on which choice of a burning system rests.

Small Stone Calcination Trend The days of burning large lumps of stone are numbered. Quarry mechanization, mechanical and continuous processing and handling of materials, higher heat transfer rates and shorter calcining periods, fewer and larger lime plants, greater manufacturing control, as well as better handling and utilization opportunities of lime by the consumer—all these point to the general trend and need for calcining small crushed stone efficiently in units of at least 25 tons of lime per day and up. There is no missing link yet to be found, as it is well within our engineering know-how to develop techniques for burning sizes from two inches on down to dust at high efficiencies and control. Designers are working on this problem from several angles, employing any or all of the four basic methods just mentioned, and there is no doubt that we will soon see considerable improvements in calciners to fill this obvious present gap.

Some Stages of Development When it comes to calcination of gravel-to-sand-size limestone particles, it might be of interest first to see what others have done in the past with this problem in the field of heat-treating small crushed ore in general. The great deterrent to burning lime or calcining any small-sized ore with a high degree of thermal efficiency in relatively low-cost and simple kilns has been, of course, the limited penetration of hot burning gases through the fine material bed or column. For this reason efficiency and fuel cost was sacrificed by passing hot gases over, instead of through the ore bed. In California in 1875, the inclined bed Scott furnace for quicksilver ore calcination made it possible for small crushed ore to be roasted in a vertical gravity-type kiln in which the bed of material slid and rolled down alternating inclined baffles or hearths, the hot gases passing at right angles to the flow of material over the thin bed as it moved down. (See Figure 1.) Although temperature restrictions for this particular process required gases of lower tem-

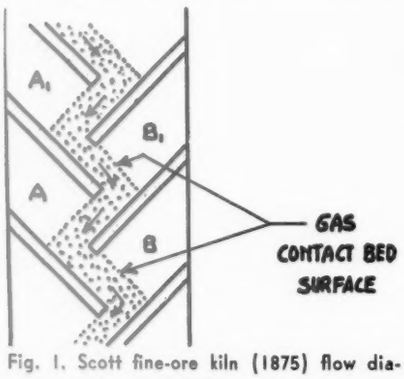
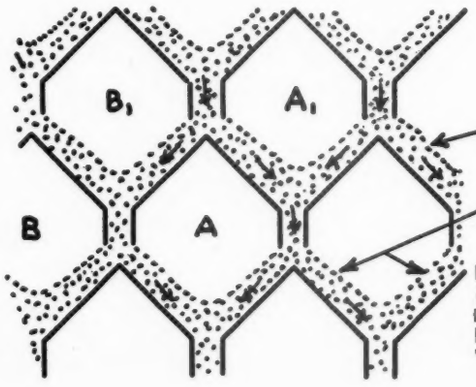


Fig. 1. Scott fine-ore kiln (1875) flow diagram.



Right: Fig. 2. Cermak-Spirek fine ore kiln (1886) flow diagram. Note: Hot gases travel at right angles to sectional views under baffles and tiles along "A" and back in at "A_1"—or back and forth in "B" and "B_1".

perature than would be employed for limestone calcination, this type of kiln could have been adapted to such lime burning. Efficiency would not have been very high, however, for obvious reasons. A little later in 1886, Spirek came out with a modified version of the inclined bed in Italy, in which the fine ore was made to flow by gravity down closely-spaced staggered gable tiles, somewhat in the arrangement manner of the Ellernan kiln, except that the hot gases moved back and forth through the ducts, sweeping at right angles to the flow of the thin bed, traveling downward, instead of passing upward through the material itself. (See Figure 2.)

The need for small sizes of limestone calcination was not a pressing one in those days, and as the rotary kiln became more widely used, such simpler and lower-cost calciners of this type received little attention from the lime plant operators. The use of preheated lime-cooling air, which was an obvious and logical technique for mixed-feed kiln operation, was not so obvious to lime burners until the development of gas-fired kilns, where it became a possibility and fostered higher heat recovery and fuel efficiency.

Center Burners In the meantime, around 1880, in Chester County, England, a civil engineer by the name of Healey introduced the first center-burner, gas-fired vertical shaft kiln, and took out several patents between 1882, and 1884, on his hollow center pier-type burner. This constituted a big advance in shaft kiln lime burning, even though it was not adopted very widely by the industry until rather recently. Healey's original center-burner design has seen little basic change since that day, except that it has been further elaborated and modified for various patent and functional reasons. Figure 3 indicates the Healey center burner, showing a cooling air duct above the gas duct, and the 12 gas ports used in his burner. The preheated air for combustion was drawn up through the material from the cooler. Healey's kiln also introduced gas from side ports to augment the center burner, the gas to the various ports being under damper or gate control. Above the gas duct in the burner can be seen one or more air ducts to help cool the burner top. Schmatolla, the European kiln designer, also employed center burners, according to Knibbs, and was the first in this country to introduce preheated air from the cooler for gas kilns.

After World War I center burners of the hollow-pier type were used in this country in large shaft kilns, such as those of the Louisville Cement Company lime plant in Indiana, or those which were operated by the National Gypsum Co. at York, Pa. As some of the obvious advantages of center-burner kiln firing became more apparent, most of the further refinements and modifications in this type of burner for shaft kilns were worked out by Victor J. Azbe, who has specialized in this method of firing vertical kilns. In the southern states, where natural gas is the prevalent fuel, the center burner was and is used in simplified form by quite a number of lime plants, often in conjunction with the regular old-fashioned punching eyes through which also some gas is introduced. The column burner developed by the writer was designed for more complete utilization of the circular cross section of standard round kilns, as well as for reasons of symmetry in stone flow and radial gas distribution from the center to the walls.

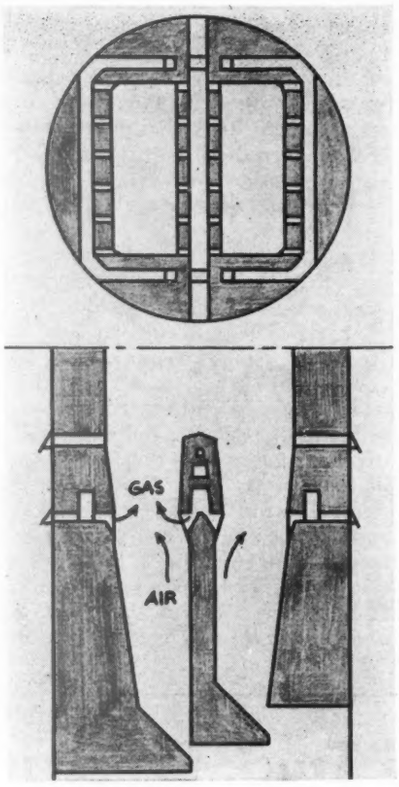


Fig. 3. Original Healey centerburner kiln (1884)

There are several other schemes of burner design in which gases are injected into the stone or lime column from side ports under high pressure and velocity, as in the case of the tuyeres of cupolas and blast furnaces. Combinations of alternate high and low velocity gas streams may be employed for wider distribution, as well as the firing at two or more levels in the kiln. In such cases, the faster center moving section of the ore column must be slowed down with some type of saddle, pier, or column, if the draw openings and cooler partitioning arrangements do not allow the flow to be equalized. The advantages of introducing practically all the combustible gases in the center include longer kiln-lining life, better heat distribution, more even down travel of the ore, and the distribution of heating gases over a larger active cross-sectional kiln area.

However, as size of ore is decreased to less than about one inch, new conditions affecting power and kiln size arise, and a mere narrowing of the gas-penetrating zone or multiplicity of burner arrangement will not always suffice. It is quite true that as we increase the surface factor of the ore bed by decreasing the particle diameter, we can reduce, theoretically at least, the height of ore column, and so hold the power for gas movement constant. However, this can be done only if and when the distribution and speed of combination and its vertical area can be proportionally reduced with the height. This is, on the other hand, not quite so simple, and considerably more power must be used to move gases through a relatively high bed column. The writer's experience with small-stone burning has shown that the stone to the kiln must be clean and rather closely sized, and that hot-zone temperatures must be kept low in order to obtain continuous discharge movement without uneven downtravel conditions. Operations also become much more sensitive to small changes of time and temperature, which in turn requires a higher degree of automatic control and instrumentation.

Is Deep Gas Penetration Necessary? The writer feels that the burning of small stone in vertical type calciners can be mastered more readily if we realize that this limiting gas penetration and distribution is only a relative matter, *i.e.*, relative to the movement of gas with relation to that of the stone. In forcing a gas stream horizontally into a vertically-moving column of lime particles, as we do from ports of side and center burner, the distance of penetration is not only a function of the ore resistance, but is related also to the volume and shape of the gas stream issuing from

the gas ports, as well as to the velocity of the gas. A further modifying factor is the difference in pressure and velocity and direction of the gases moving past the burner ports and through the ore bed in the zone through which the burner gas is injected. Since this gas stream from a burner port tends to fan out side-wise and upward, due to the obstructing lime particles and the upward movement of the air coming from the cooler, it soon reaches its horizontal component limit. By the judicious use of air or hot waste gas streams immediately below or above the combustible gas streams, we may increase the penetration to some extent. As we come down to smaller stone sizes, however, the whole problem of uniform gas distribution becomes more difficult, and increased gas pressures and velocities do not solve the main problem.

It is quite possible that from here on we must reverse our technique, and instead of forcing the gas across the moving bed of a column, we could very well move our bed or column diagonally across an upward rising gas stream. This brings us back to the inclined bed kiln principle of Scott and Spirek, except that we would use the more efficient heat-transfer-by-convection method of passing the heating gases through, rather than over the material. It is true that more power will be required, but this will be with the added advantage of good heat transfer at relatively low temperatures of burning, which, after all is one of the things we are striving for in the manufacture of chemically reactive calcium oxide.

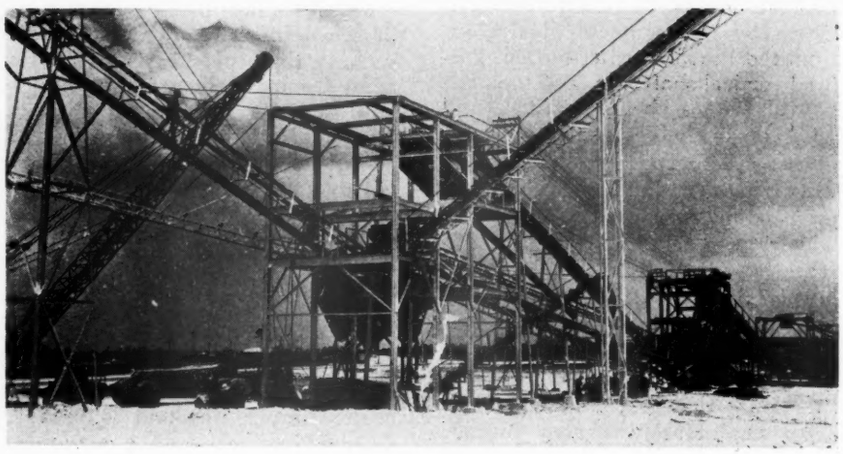
In the Ellernan calciner and the Kennedy Van Saun preheaters and coolers for rotary kilns this diagonally-opposed and reversing flow of solids and gases is employed by the use of staggered gas ducts, as shown in the Spirek kiln. Material is actually flowing alternatingly and diagonally down over the inclined surfaces of the cross ducts, thereby cutting the gas stream at each reversal. It is at once obvious that such gas need not have any great horizontal velocity or penetration in order to reach all particles. Problems with this type of materials-heating device center on the uniformity of gas escape along the whole edge of the duct, possible adaption to full gas firing, heat control to prevent sticking, and design for units of greater output without losing simplicity and unified operating control.

Another logical and coming future step will be the calcination of limestone of sand sizes down to dust. In the May, 1942, issue of PIT AND QUARRY the writer first voiced his views on this phase, and probably earned a good crop of derisive remarks or comments pertaining to wishful thinking. Since that time experiments have been carried forward, and it will be possible in the near future to publish some of the interesting results and principles employed in calcining limestone in a matter of a few minutes or seconds at extremely low temperatures and high efficiencies.

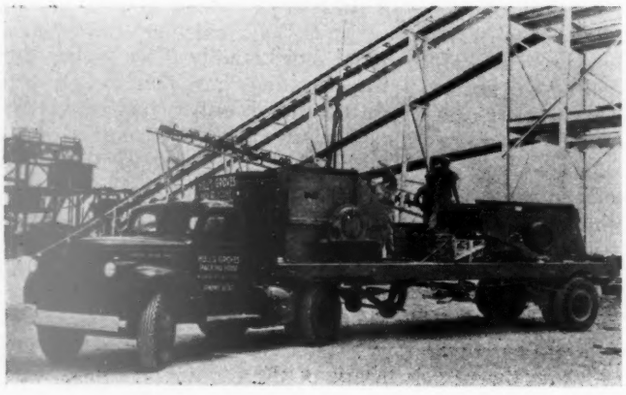
Milwaukee-Miami Truck Express Speeds Installation of Equipment

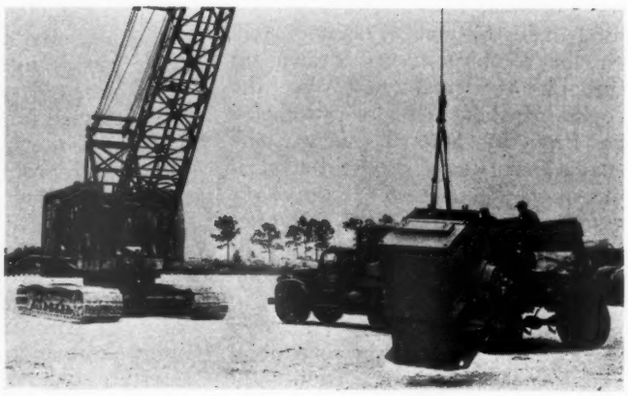
The Pit and Quarry Directory will show you that a large and steadily-growing percentage of ready-mixed concrete plants are operated by aggregates producers.

In order to expedite completion of its new plant, the Miami Crushed Stone Co. has been having new equipment shipped by truck from Milwaukee, Wis., to the plant site at Miami, Fla., a round-trip distance of approximately 3,000 miles. The illustration at the —— shows the new plant, which was scheduled to begin production on May 1.



Below, left: One of the G.M.C. tractor-and-trailer units just after its arrival at the plant. Right: A Nordberg 36-inch impact crusher and an Allis-Chalmers 4- by 8-foot scalping screen are about to be unloaded by one of the plant's P & H cranes. Although the trip from Milwaukee took four days, the delivery was made at least 20 days sooner than would have been possible by railway under present conditions.





From start-up ...to shut-down

ROCK DRILLS NEED AN OIL THAT DOES 5 JOBS

IT'S the start of the shift—the drill is cold. Here's Job No. 1 for the oil you use: low-temperature fluidity for easy starting . . . for "full throttle" drilling without delay.

As the drill warms up, it demands that the oil, (2) lubricate safely despite extreme shock loads, (3) resist oxidation which would result in gum and carbon formation, (4) form a water-oil emulsion that will give lubrication even though excessive amounts of water get into the drill.

With the end of the shift, you're ready to stop, but the oil in the drill must go *right on working.* That's because Job No. 5 is protection—rock-drill oil must have high metal-wetting ability to prevent rusting of the precision-ground parts of the cylinder and valves, especially when the tool is idle.

Does this sound exacting? It is. This is a job for Shell Clava Oil—an oil that is specially handled, from crude selection through final compounding, for superior service in percussion air tools.

The Shell Lubrication Engineer will give you advice about the lubrication of any compressed air equipment. For informative literature, write Shell Oil Company, Incorporated, 50 West 50th St., New York 20, N. Y.; or 100 Bush St., San Francisco 6, Calif.

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PERSONAL MENTION

The Harbison-Walker Refractories Co., Pittsburgh, announces the appointment of FRANK WEIR as district sales manager of the St. Louis district sales office at 1325 Ambassador Building, St. Louis, and KARL W. SIELING as district salesmanager of the Houston district sales office.

Frank Weir

Mr. Weir and Mr. Sieling have served on the Harbison-Walker staff for several years in their respective districts.

ALBERT R. HOCK and WILLIAM R. CARNEY were recently elected by the board of directors of the Dolese & Shepard Co. of Chicago as the firm's chief executive officers.

Mr. Hock became president and Mr. Carney vice-president of the company, which produces crushed stone, dolomite for fluxing and agricultural limestone.

FLOYD L. MABIE, for the past nine years manager of Atlas White Bureau of Universal Atlas Cement Co. of New York, subsidiary of the United States Steel Corp., has resigned after eighteen years of service with the company to become president of a concrete products manufacturing concern in Greensboro, N. C.

P. F. Morrissey

F. L. Mabie

Appointed to succeed Mr. Mabie, as manager of the Atlas White Bureau, effective May 1, 1946, is PATRICK F. MORRISSEY, former Atlas White representative in the Kansas City area. Mr. Mabie joined Universal Atlas in 1928 as Atlas White representative covering northern New Jersey and New York. In 1930, he was made assistant manager of the Atlas White Bureau, and in 1937 was appointed manager.

WILSON B. TRUNDLE, who was during World War II engaged in various engineering projects concerned with the war effort, has been appointed manager of the American Rock Wool Company's plant at Wabash, Ind. Mr. Trundle succeeds BOB WOOD, who was transferred to the South Plainfield, N. J., plant.

RICHARD WILLE, who has returned to the Inland Lime & Stone Co. plant at Port Inland, Mich., after five years of service in the United States Army, has been named assistant sales manager. He succeeds WILLIAM A. CORSON, who has replaced the late GORDON HUGHES.

EDGAR M. BROWN took over the operation of the Brown Sand & Gravel Co. of Pasco, Wash., on March 1. The plant had been worked on a lease basis for the last several years by HAROLD MATHESON. Associated with Mr. Brown will be LOUIS M. JONES, his son-in-law.

FRED W. KUHL, veteran employee and secretary-treasurer of the Kelley Island Lime & Transport Co., of Cleveland, O., was honored recently at a dinner given by his associates to mark the 18th anniversary of his election to his present office.

Other guests included JOHN J. GUERIN, former assistant to the president, retired, who served the company for 50 years; WILL L. LANE of Marblehead, O., an employee of 55 years' service; and officials from Kelley Island plants in Ohio, Michigan and New York.

HARRIS N. SNYDER, vice-president, treasurer and general manager of the Buffalo Slag Co., Inc., of Buffalo, N. Y., has been elected a trustee of the Buffalo Savings Bank. Mr. Snyder is also vice-president and treasurer of the Federal Portland Cement Co., Inc., president of the Federal Crushed Stone Corp., and president of the Hornell Gravel Corp., all of Buffalo.

BEN KIMBROUGH, JR., released from the United States Navy after having served 37 months in the Pacific theater, has taken over the management of the 4-K Sand & Gravel Co. of Hugo, Okla.

H. S. FOWLER, formerly of Consolidated Mining & Smelting Co., at Trail, B. C., Canada, has joined the Pacific Lime Company as superintendent of the quarry and plant at Blubber Bay on Texada Island, B. C.

GORDON TONGUE, who has been secretary-treasurer of Superior Portland Cement, Inc., of Seattle, for nearly 33 years, recently resigned from his post. He will become affiliated with C. E. Howard & Co. of Los Angeles.

Replacing Mr. Tongue as treasurer will be GEORGE A. CAMPBELL, a company auditor who has been with the firm since 1910. The duties of secretary will be assumed by JACK B. LOUGHARY of the sales department.

HAROLD E. LEMARQUAND was recently appointed eastern Canada sales manager for Gypsum, Lime & Alabastine, Canada, Ltd., of Paris, Ont., with headquarters at the company's offices in Montreal.

Mr. LeMarquand, who has been with Gypsum, Lime & Alabastine for the last 18 years, recently in charge of sales in eastern Quebec, will succeed the late A. E. MCLEOD, whose death occurred last January.

L. C. HART, vice-president of the Johns-Manville Corp., addressed delegates assembled for the 34th annual meeting of the United States Chamber of Commerce at Atlantic City from April 30 to May 2 on the subject of "The Outlook for Building Materials." The final address of the meeting, delivered at the annual banquet, was given by ERIC A. JOHNSTON, U. S. Chamber of Commerce president.

The appointment of WALLACE WATERFALL as director of research and product development for the Celotex Corp. of Chicago was recently announced.

W. Waterfall

Mr. Waterfall returns to Celotex after a three-year leave of absence as a member of the scientific staff of Columbia University, Division of War Research. His association with Celotex dates back to 1925, early in the firm's history. He has served in the various capacities of acoustical engineer, research engineer and manager of the acoustical department.

WILLIAM A. RIGGS, who was associated with the Republic Mining & Manufacturing Co. of New York City as a mining engineer before serving in the United States Naval Reserve, has been appointed industrial geologist of the Atlantic Coast Line Railroad Co., with headquarters in Wilmington, N.C. Mr. Riggs was affiliated in earlier years with the Pittsburgh Limestone Corp., the South American Development Co. and the Anaconda Copper Mining Co.

J. W. GWIN, who was on the Ideal Cement Co. staff at the Hanover, Mont., plant office before his period of service in the United States Army, has been named chief clerk of the Colorado Portland Division at Portland, Colo. Mr. Gwin replaces E. J. Stampfel, who recently resigned.

Officers and directors of the National Gypsum Company were re-elected at the annual stockholders' meeting in Buffalo. They are as follows: M. H. BAKER, president; R. F. BURLEY, vice-president in charge of sales; J. C. BEST, vice-president in charge of industrial sales; G. H. TARBELL, vice-president in charge of production; D. D. CRANDELL, vice-president in charge of research; F. E. DAVIS, secretary-treasurer.

Permanente Products Co. announces that ROBERT C. MAENTZ, who was formerly in charge of refractory sales in the Pittsburgh district, has been named

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OPALINE CHASSIS LUBRICANT . . . a tough, sturdy lubricant that protects while it lubricates . . . in spite of rain, snow and mud.

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NEW
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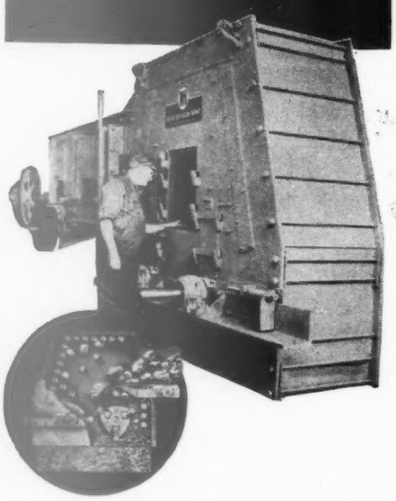

NEW HOLLAND MODEL 3030
DOUBLE IMPELLER BREAKER

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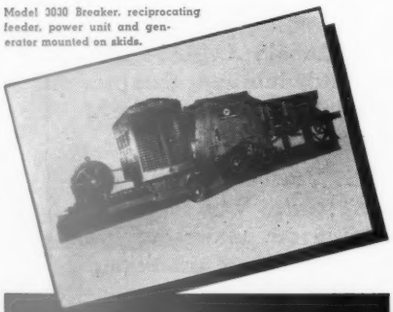
Products from agricultural lime dust to road ballast stone can be produced in one pass with a relatively small percentage of oversize. Oversize may be re-run just as is done in any conventional closed circuit plant.

Ideal for the low cost production of ag-lime, or various sizes of road rock and concrete aggregate, it is equally suitable for gravel or quarry operation. For complete information, write Dept. E-2, Industrial Division.

Model 3030 Breaker, reciprocating feeder, power unit and generator mounted on skids.



NEW HOLLAND
MACHINE NH COMPANY
NEW HOLLAND, PENNSYLVANIA

sales manager, Eastern Refractories Division, with headquarters at 1712 First Central Tower, Akron, O.

J. O. Lewis

JOHN OWEN LEWIS, former superintendent of the Celotex Corporation's gypsum plant at Hamlin, Tex., has been appointed works manager, according to an announcement released by Howard G. Philbrook, vice-president.

Mr. Lewis was board plant superintendent at Hamlin for the Texas Cement Plaster Co. when Celotex acquired that firm in 1945.

W. C. LEFEBVRE was chosen by the Arizona Highway Commission to serve as state highway engineer, succeeding BERNARD TOUHEY, who resigned, effective April 1, to enter private business.

Mr. Lefebvre, who was awaiting release from duty with the U. S. Navy, previously was state highway engineer; he had also served as state engineer for the Works Progress Administration and as Phoenix city manager.

W. F. Farst

Appointment of WALTER K. FARST as general manager of the Pittsburgh Plate Glass Company's cement plant at Zanesville, O., has been announced by E. T. Asplundh, vice-president in charge of the company's chemical and cement division. Mr. Farst succeeds the late Arthur R. Haley.

Associated with the company's Columbia Chemical Division for 23 years, Mr. Farst has been chief engineer in chemical plants operated by the division for the last five years. He joined the company as a rodman in the engineering department at Barberton in January, 1923.

TOM K. RONEY, city engineer of Hopkinsville, Ky., has been made general manager and treasurer of the Christian Quarries, a co-operative venture of farmers in Christian County.

R. MELVIN POTTENGER is the new manager of the Perkins Gravel Co. at Perkins, Calif., according to an announcement made by A. A. TEICHERT, JR., president of Teichert & Son, Inc., of Sacramento, owners and operators of the plant.

M. J. HOFFMAN was named president of the American Association of State Highway Officials at their annual meeting, held January 29 to February 1 in Oklahoma City. Mr. Hoffman, a member of the Minnesota highway department, succeeds HERMAN A. MACDONALD.

Edw. Quebbeman

EDWARD QUEBBEMAN, former office boy and now sales manager with the Universal Atlas Cement Co. of Chicago, a United States Steel Corporation Subsidiary, celebrated his fiftieth anniversary with the organization at a dinner at the Palmer House in Chicago, tendered him by his company associates on April 1.

Mr. Quebbeman joined the staff of the St. Louis office while it was still only a department of the Illinois Steel Co. Since 1928 he has been sales manager for the territory including Indiana, Michigan, Wisconsin, Kentucky and Illinois except metropolitan Chicago.

ALEXANDER J. CASSATT was elected recently to the board of directors of the Pennsylvania Salt Manufacturing Company. Mr. Cassatt is vice-president of the Western Saving Fund.

WILLIAM M. JONES, who was formerly Eastern representative of the Cleveland Quarries, Inc., of Cleveland, has been named vice-president and general sales manager.

PERFORATED METAL SCREENS
FOR SAND, GRAVEL
STONE, ETC.

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OBITUARIES

J. H. McNamara

JAMES H. MCNAMARA, treasurer of the National Lime Association and president of the Eagle Rock Lime Co., died on May 15 at his home in Eagle Rock, Va., as the result of a heart attack. Mr. McNamara, who was known as the dean of the lime industry, had attended a meeting of the Association's Board of Directors at Hot Springs, Va., only a few weeks before his death.

James H. McNamara had gained his knowledge of the lime industry as a young man while engaged in the lime business at Rockland, Me. Later he organized the Eagle Rock Lime Co. at ganized the Eagle Rock Lime Co.

Rolla L. Beal

ROLLA L. BEAL, who was for 33 years chief chemist for the Wyandotte Chemical Corp. of Detroit, died unexpectedly at a hospital in that city on April 5, at the age of 58 years.

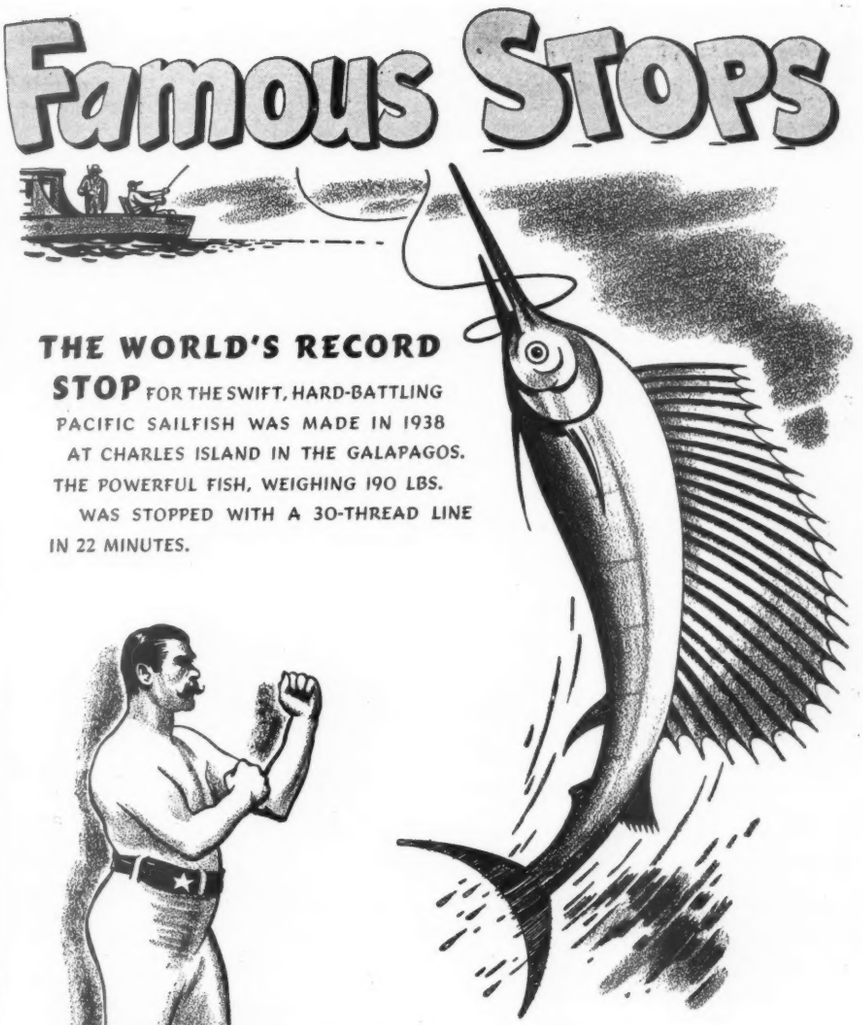
Mr. Beal, who was well known in the cement industry, was a member of several honorary national engineering and chemical societies.

EDMUND D. BARRY, formerly of New York, Chicago and Pittsburgh, died in Alameda, Calif., on May 6. Mr. Barry joined the Universal Atlas Cement Co., a United States Steel Corp. subsidiary, in Chicago in 1903. He became superintendent of its plant there in 1905 and went to Pittsburgh in 1907 in connection with the construction of a new plant at Universal, Pa., of which he subsequently became superintendent. In 1930, he was appointed assistant operating manager (Chicago) and later became manager of industrial relations at New York.

WILLIAM F. MACGLASHAN, founder and president of the old Beaver Board Co. of Buffalo, N. Y., died recently in California. The Beaver Board Co. was sold to the Certain-Teed Products Corp. of Chicago in 1924.

HAROLD DRAKE, 50, purchasing director for the National Gypsum Co., died suddenly on May 11 after a heart attack in his home in Buffalo. Mr. Drake joined National Gypsum as purchasing director three months after the company was formed 20 years ago.

JOSEPH H. JACKSON, vice-president and general manager of the Carbon Limestone Co. of Youngstown, O., died on May 26.


Famous STOPS
THE WORLD'S RECORD STOP FOR THE SWIFT, HARD-BATTLING PACIFIC SAILFISH WAS MADE IN 1938 AT CHARLES ISLAND IN THE GALAPAGOS. THE POWERFUL FISH, WEIGHING 190 LBS. WAS STOPPED WITH A 30-THREAD LINE IN 22 MINUTES.
STOPPED IN 7 SECONDS TOM DOW KO'D NED KILEY IN THE SHORTEST BARE-KNUCKLE BOUT ON RECORD. IT HAPPENED ON JANUARY 4TH, 1868, AT LEAVENWORTH, KANS., IN THE DAYS WHEN A BOUT WAS OFTEN BROKEN UP BY THE SHERIFF OR POLICE.
FAMOUS FOR SURE STOPS
AT ALL TIMES ARE JOHNS-MANVILLE INDUSTRIAL FRICTION MATERIALS. AVAILABLE IN A WIDE VARIETY OF FLEXIBLE AND RIGID STYLES, THESE FRICTIONS "GO TO WORK" ON SWINGS, CROWDS, HOISTS AND BRAKES TO GIVE YOU THE MAXIMUM CYCLES PER MINUTE ON YOUR EQUIPMENT. JOHNS-MANVILLE, BOX 290, NEW YORK 16, N. Y.
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INDUSTRIAL FRICTION MATERIALS

Legal Decisions

By LEO T. PARKER

The higher courts seldom render so many interesting and informative decisions on nonmetallic mineral products as have been rendered during the past few weeks. Readers who know the cause and outcome of these outstanding new law suits will be enabled to avoid similar legal controversies, and also these leading higher court citations may be used to win favorable verdicts in unavoidable law suits. Readers who desire all details of any explained law suit may read the complete decisions in any good library.

Fair Labor Standards Act

According to a late higher court decision an employee need not *himself* take part in the physical process of the making of goods in order to be engaged in the "production" of goods for commerce within the meaning of the provisions of the Fair Labor Standards Act. It suffices if his work constitutes *a part* of the integrated effort by which goods are produced for commerce.

For example, in *Clifton* v. *E. C. Schroeder Company,* 153 Pac (2d) 385, reported April, 1946, it was shown that certain employees were engaged at the quarry in mining, producing, and processing stone used for gravel cushion and riprap in the construction of relocated portions of a railroad and a highway. Also, these employees hauled some of the rock from the quarry to the site of a dike which was being constructed to prevent flooding of an oil field by water, and thus permit the continued and uninterrupted production of oil and its movement in interstate commerce. These employees sued their employer to recover overtime compensation, liquidated damages, and attorney's fees pursuant to the provisions of the Fair Labor Standards Act.

The higher court held in favor of the employees, saying:

"It is not necessary that the employee must himself take part in the physical process of the making of the goods. It suffices if his work constitutes a part of the integrated effort by which goods are produced for commerce. Stated otherwise, it is enough if the work of the employee has such 'close and immediate tie with the process of production for commerce' that it is in effect a part of it."

Another higher court decided that employers are not required to pay wages specified by the Fair Labor Standards Act, if the greater part of the employee's work is "servicing" vehicles used in intrastate commerce. In *Rachal* v. *Southwest Service, Inc.,* 23 So. (2d) 637, reported January, 1946, a night watchman sued his employer to recover back wages, attorney fees, etc. under the Fair Labor Standards Act. The testimony proved that the greater part of the company's business was servicing motor vehicles used in *intrastate* work, although occasional servicing was done on a few vehicles used in *interstate* commerce. The court refused to hold in favor of the watchman saying that he was not entitled to the benefits of the act.

Does No Interstate Business

The fact that a seller sells his products exclusively to purchasers within the state does not exempt him from compliance with the Fair Labor Standards Act, if the purchasers use the materials to make merchandise shipped in interstate commerce. In *Dize* v. *Maddrix,* 144 Fed. (2d) 584, suit was filed by employees against a corporation to recover unpaid overtime compensation, liquidated damages and a reasonable attorney's fee under the Fair Labor Standards Act. The corporation officials proved that this corporation did *not* sell any materials to purchasers located outside the state. However, since the materials were used by the purchasers in interstate commerce the higher court held the corporation within the scope of the law.

O. P. A. Rulings

It is well established law that if a renter of equipment willfully violates O.P.A. rulings he may be heavily penalized. However, if he used reasonable care to abide by such rulings the court will render a favorable verdict. For illustration, in *Basler* v. *Sharp & Fellows Company,* 166 Pac. (2d) 403, reported April, 1946, it was shown that the owner of equipment applied to the O.P.A. for ceiling prices on rentals of the equipment to a contractor. The owner complied with the advice of the O.P.A. However, later the contractor found that the rentals were in excess of the O.P.A. ceiling prices. He refused to pay and the owner filed suit. The court held that where an owner of equipment makes an earnest attempt to comply with O.P.A. regulations in renting his equipment, he is within the law and is not subject to penalties. This court said:

"The respondent [owner] made an earnest attempt to comply with the Regulation, and received at least implied approval of his charges."

Owner Compelled to Sell

When the owner of a business agrees to sell it he cannot refuse to complete the transaction. For example, in *Smith* v. *Davidson,* 31 S. E. (2d) 477, it was shown that the owner of a business verbally told a man named Smith that he was being drafted into the armed forces within the next few days, and that he would sell his business for a cash price of $3,600. Later the owner decided he would not sell his business and Smith filed suit asking the court to compel the owner to fulfill his agreement. The higher court held in favor of Smith.

What Is Accident?

According to a late higher court decision, an employee who is injured in a fight may recover compensation under the State Workmen's Compensation Act, for an "accident." In *Lanford* v. *Clinton,* 30, S. E. (2d) 36, it was shown that an employee named Lanford had a fight with another employee, named Heaton. Heaton bit off a portion of one of Lanford's ears. Lanford filed a claim with the Industrial Commission, under the Workmen's Compensation Act, for serious head and facial disfigurement. In allowing Lanford $2,000 compensation the higher court said:

"While a willful assault may be said not to be an accident so far as the aggressor is concerned, to him, who is not the aggressor, there exists the unexpected factor necessary to constitute an accident as contemplated by Workmen's Compensation laws."

Limitation Liability

In *Colonial Sand & Stone Company, Inc.* v. *Muscelli,* 151 Fed. (2d) 884, reported February, 1946, it was shown that the company was the charterer and owner *pro hac vice* of a lighter. An employee claimed to have sustained injuries while on board and sued to recover $100,000. Since the value of the lighter does not exceed $14,000, the employer pleaded its right to limit liability to this amount. The higher court held that a vessel owner in order to limit his liability need prove only that he has been sued for some loss, damage, or injury done, occasioned, or incurred without his knowledge, and that he wishes to claim the benefit of the limitation of liability to the value of the vessel.

Screenings Not Taxable

Recently, a higher court held that rock screenings are not taxable. Thus, in effect this court held that screenings have no practical or established value. In *Dolese Brothers Company* v. *Nichols,* 165 Pac. (2d) 982, reported March, 1946, it was shown that the Dolese Bros. Company is engaged in the business of operating a plant for crushing rock. The county tax assessor assessed for taxation screenings, which are small particles of rock and dust coming out of the crushed rock when being screened. This higher court reversed the ruling of the county tax assessor, and said:

"It is the opinion of the court that said screenings were not taxable. . . ."

Fair Labor Standards Act

According to a late higher court decision, all employees must be paid wages specified by the Fair Labor Standards Act, if such employees do work "necessary" to the production of goods shipped in interstate commerce. In *Walling* v. *Pueblo Sand & Gravel Company,* 153 Fed. (2d) 159, reported March, 1946, it was shown that the company owns and operates a sand and gravel plant. The Colorado Fuel & Iron Corporation owns and operates a large steel mill near Pueblo in which it produces iron and steel. From such iron and steel it manufactures railroad rails, construction beams, castings, wire, and numerous other iron and steel commodities. These commodities are shipped in interstate commerce to all parts of the United States. The Pueblo Sand & Gravel Company has for several years sold cast shed sand to the steel corporation. The troughs which carry the molten metal and slag from the blast furnaces are lined

with the cast shed sand to protect such troughs from the intense heat of the molten metal and to prevent the molten metal from sticking to the troughs and thus interfering with its free flow through them.

Certain employees of the sand and gravel company contended that they were entitled to wages specified by the Fair Labor Standards Act. It was contended that although the employer did no interstate business, yet they were engaged in an occupation "necessary to production of goods for commerce" within the meaning of the Fair Labor Standards Act, because they mined, mixed, washed, and prepared the cast shed sand which was sold to and used by the steel mill which sold and shipped its products in interstate commerce. The higher court held that the Pueblo Sand & Gravel Company must pay its employees the wages specified by the Fair Labor Standards Act, saying:

"The work of such employees is intimately related to the actual physical process by which the steel goods are manufactured. Their work is tied so closely and immediately with the process of production of goods for commerce, that such employees should be regarded as engaged in an "occupation 'necessary to the production' " of goods for commerce."

Questions and Answers

[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers. Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—Ed.]

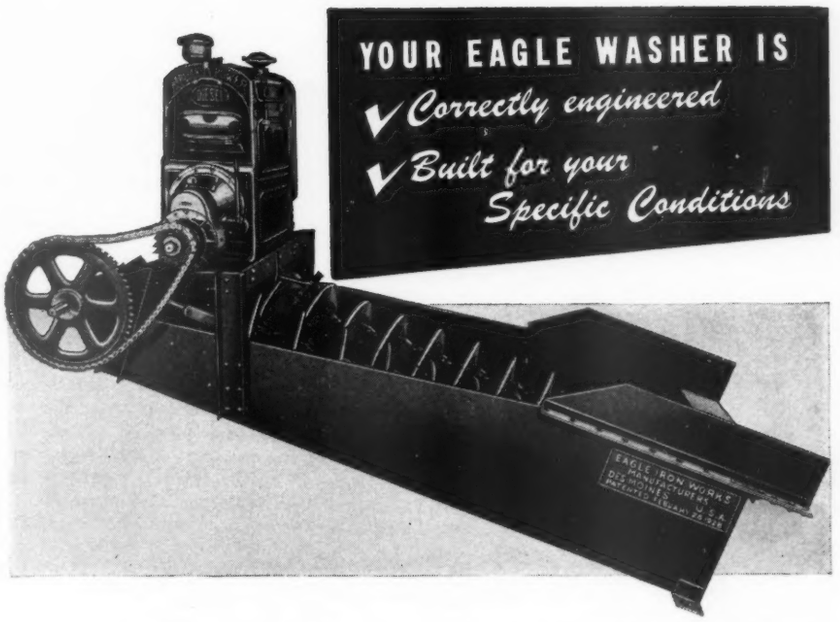
Legal Editor: We made a contract to supply rock to a county. Now, after using the material the officials refuse payment because of a state law which states that in all contracts for over $500 worth of goods the seller must obtain the consent of the voters. Can this county keep this rock and then not pay us?—W. C.

Answer: Yes, it is true that the county can not be compelled to pay for goods not purchased according to valid state laws. In other words, if you did not obtain the consent of the voters, and the contract was for more than $500, it is illegal and you can not collect the amount due you.

Legal Editor: Not so long ago I had a peculiar experience and I thought that you would want to publish it. I parked my $2,500 automobile in a first class parking garage. When I presented my ticket to get my car the officials said it was not in their garage. I have not got my automobile. What can I do?—G. R.

Answer: Nothing, unless you prove, first, that you parked your automobile in this garage; second, that you did not later receive it; third, that the garage company's employees were negligent and that their negligence resulted in the loss of your car. Before you file any suit be certain that you have testimony and witnesses to prove these facts.

Legal Editor: A few days ago a fellow named White who is very wealthy signed a contract to perform services for us. We have made a profit of $12,500 on the



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Water flows in a rising current, with uniform action that thoroughly removes foreign material.

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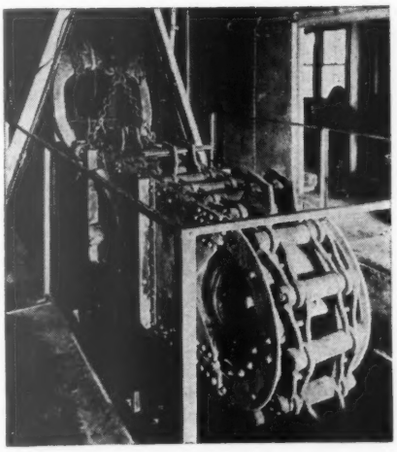

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deal. Later, after we had spent some $7,000 to fulfill this contract, this White refused to go through with his contract. He says that he is a minor and that we have no legal rights.—W. & A. C.

Answer: A peculiar law in *all* states of the United States says that a minor may demand that his contract be fulfilled, or he may repudiate it. Thus, you have no legal rights against White, who declares that he repudiates the contract.

Legal Editor: In 1940 I failed to claim reductions in my income tax which later I found I ought to have claimed. This city government said that was in the past and I could not get this credit. Can you tell me anything in my favor?—J. C. J.

Answer: Failure of a taxpayer to claim legal deductions in his first income tax return does *not* bar him from subsequently claiming these legal deductions. For illustration, in *Gentsch* v. *Goodyear Tire & Rubber Company,* 151 Fed. (2d) 997, reported February, 1946, the suit involved a credit for deduction from gross income in payment of income tax. In this case tax deductions were not claimed when the tax return was filed. It was contended that failure of the taxpayer to include these deductions in the return forfeited his rights. The local tax board decided in favor of the government, on the ground that credit should have been claimed by the taxpayer in the original return. The higher court reversed this decision, saying:

"Relief from double taxation is not so much an act of grace as one of justice in determining the true net income of the taxpaper."

Legal Editor: If a truck driver gets drunk and injures a person can his employer be held responsible? Can the person get compensation?—T. C. C.

Answer: Modern higher courts consistently hold that there should be accorded to the Workmen's Compensation Act a broad and liberal construction. Doubtful cases will be resolved in favor of compensation to the employee or his dependents.

In *Elm Company et al. v. Sullins,* 180 S. W. (2d) 113, reported July, 1944, it was disclosed that an employee was killed when he fell out of a moving truck. A fellow employee testified that, "We were talking and I was trying to get him to let me drive. I knew he had been drinking. He drove across the line two or three times and I got him to stop."

Dependents of the deceased sued the employer for compensation. In rendering its decision in favor of the dependents, the higher court said:

"The burden is clearly upon appellant (employer) to show, by the testimony, that Sullins' death resulted solely from his intoxicated condition."

However, I can cite you cases where intoxicated truck drivers were convicted of murder and sentenced to serve 45 years, 20 years, and another 5 years in the penitentiary because when drunk, they killed pedestrians.

Legal Editor: What about the right of employees to get pay for unemployment, when they can get work? Is this right and lawful?—W. C.

Answer: Many higher courts have refused to allow unemployment compensation to an employee who refused to accept employment which paid reasonable wages. And see *Standard Bleachery Company v. Unemployment Compensation Commission,* 40 Atl. (2d) 558, reported March, 1945. In this case an employee sued to recover unemployment compensation. However, the testimony showed that he was not able to work because of a rheumatic heart condition. The court held that this evidence precluded an award of unemployment compensation.

Other courts have held that the act of accepting compensation is unlawful if the person can get a job which pays "reasonable" wages. In this respect the term "reasonable" means in comparison with the wages the employee ordinarily earned. And see *Gorcia,* 161 Pac. (2d) 972, where the higher court held that a "reasonable" worker must endeavor to find work for which he is reasonably fitted. Otherwise he is not entitled to receive unemployment compensation.

Legal Editor: Can you tell me what rights a purchaser of low priority has? What I most want to know is can a purchaser with a low priority rating make a seller ship merchandise?—McC. C.

Answer: The higher courts will not always excuse a seller for damage if he fails to complete a valid contract on the excuse that the purchaser who enters the complaint has no priority rating. See *James Company v. Republic Corporation,* 31 N.Y.S. (2d) 857. When the dates for delivery of purchased materials arrived, the seller did not fill the orders because the purchaser had no priority rating. In this suit it was proved that the seller's stock had been depleted when he filled orders received from purchasers who had high priority ratings. The higher court held that this seller was not excused, nor relieved from damages, although all the merchandise owned, held, or controlled by him had been allocated to sellers entitled to preference for national-defense purposes.

In another late case the higher court held a building owner liable in $12,000 damages because he did not have high priority ratings to get material so that the contractor could complete his contract in doing repair work on the building. Thus in contracts between building owners and contractors the law presumes that the building owner can and will get materials to enable the contractor to complete the contract.

Legal Editor: I am planning to enter into a three-man partnership to establish a cinder block manufacturing business, and I should be pleased to have your suggestions for drawing up an average form of partnership agreement with the usual conditions of sharing profits and loss alike among the partners. Do you have a standard form of partnership agreement that could be used as a model for my needs?—J. P.

Answer: I advise you to consult a local lawyer for information as to partnership agreements in your state. It will pay you to do so, and you will have protection in every respect. Of course, there are many things to be considered. First, any partner is liable for the full debts of a partnership business, unless the laws of "limited" partnerships are followed. Every state has different laws in this respect. Also, any partner can obligate the partnership without the consent of the other partners. Therefore, it would be better for you to form a corporation and avoid these various disadvantages of partnerships.

Legal Editor: We made a contract to sell gravel. This is a written contract in which the purchaser agrees to accept and pay for the gravel on delivery. The date, quantity of gravel, quality, and other details are in the contract. But nowhere in the contract is there a clause that the purchaser "agrees to purchase the gravel." But both the purchaser and we signed the contract. Now, is it possible for us to cancel this contract?—W. S. & G. C.

Answer: All valid contracts must have what is known as "consideration." This means that your contract is void because the purchaser did not specifically agree in the contract to purchase the gravel. Although the contract was proper and legal in all other respects, the contract is void, and you can cancel it, if both the buyer and seller did not agree to buy and sell the subject of the contract. The fact that a part of this agreement was accidentally omitted does not change this usual law.

Legal Editor, PIT AND QUARRY: We bought a concrete mixer and won't pay because it's not worth what the fellow asked for it. How do we stand on the deal?—W. C. B. Co.

Answer: A purchaser is obligated to pay to a seller the amount specified in a contract of sale, if the contract price does not exceed the O.P.A. ceiling price. See *Louisiana Company v. Henry,* 24 So. (2d) 188, reported January, 1946, where it was shown that the owner of a "Blank No. 30 Dragline" sold it to a purchaser for $5,000.

Litigation arose between the buyer and seller and the court was asked to decide whether the machine was worth $5,000. This court held that the value of the machine is not an element for consideration of the court and stated that the "value" was whatever the purchaser agreed to pay and the seller agreed to accept.

In other words, you are obligated to pay what you agreed to pay for the mixer, if the seller did not breach a guarantee as to the efficiency of the machine.

Legal Editor: I am pretty mad at our local tax collector. I want your advice. Maybe you can help. Here is our deal. We produced a certain tonnage, but sold only about 80 per cent. of this amount. Maybe our production records are wrong. Anyway this tax collector says we must pay sales tax based on our books we produced. It this fair to us? We thought this tax was on our sales but the tax collector says "nothing doing." Please

help us beat this unreasonable tax collector.—T. W. C.

Answer: The collection of sales taxes on merchandise must *always* be based upon valid state laws. Therefore, modern higher courts *strictly* construe tax laws of this nature. A tax law, for example, which specifies taxes based on sales of merchandise can not be construed to mean taxes based on the production of merchandise.

For example, in *Cleveland-Sandusky Brewing Corporation* v. *Evatt,* 63 N. E. (2d) 551, reported December, 1945, a state law was litigated which specifies a tax on the *sale* of beer, ale, porter, stout and other malt liquor beverages containing more than 3.2 per cent. and not more than 7 per cent. of alcohol by weight. In other words, this statute levies a tax upon the *sales* and not upon the *production* of beer.

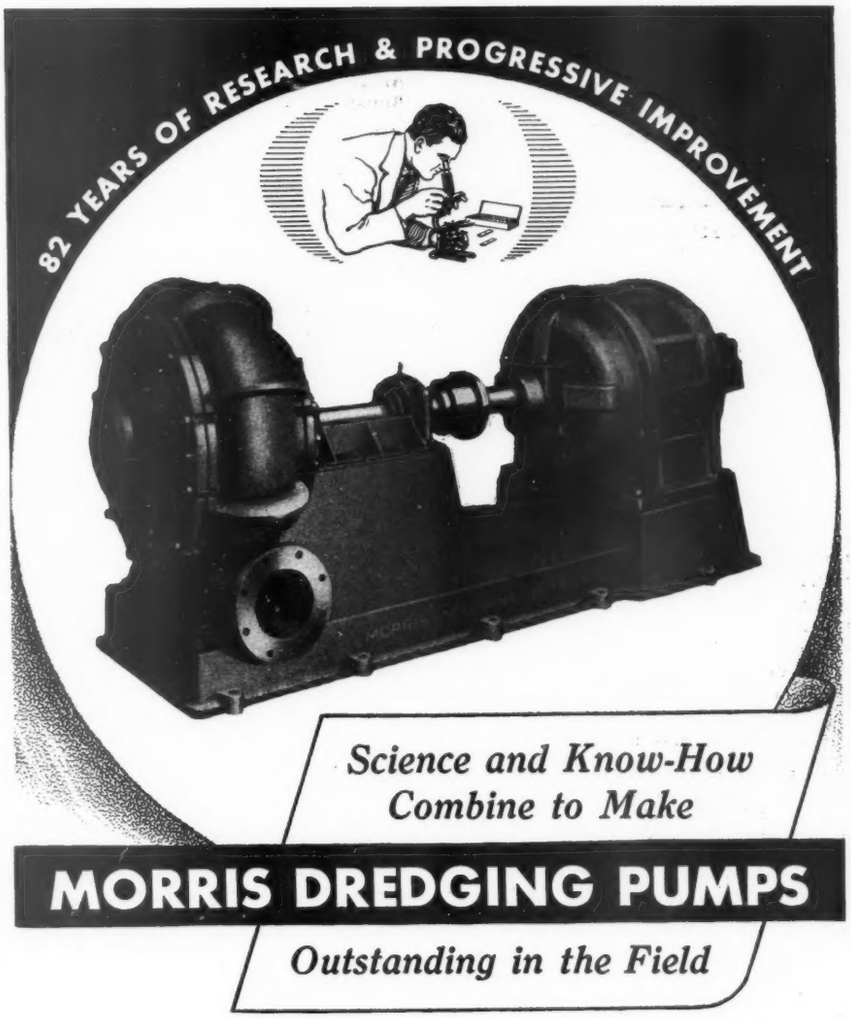
The Tax Commissioner made an audit of the books of the brewing company from which he arrived at the fact that the actual production of the kind of beer for the period of the audit, plus the amount of the physical inventory on hand on December 1, totaled 521,356 cases. Also, the Commission found that the amount on hand on November 17, plus the reported taxable and untaxable sales, totaled 518,665 cases, leaving a deficiency of 2,691 cases of such beer for which the brewery company was unable to account. The Tax Commissioner assessed against the brewery company a tax of $1,114.08, which included a penalty of $145.32 on account of the deficiency for the beer for which the company was unable to account.

The brewing company appealed to the higher court and offered testimony tending to prove that for a considerable time it had a few disloyal employees whom it suspected of stealing unstamped bottled beer, and that there were discrepancies between the *actual* inventory and the inventory which the bookkeeping records showed *should* have been in the brewing company's warehouse. The higher court reversed the Tax Commissioner and held the brewing company not liable for the assessment of taxes on the beer not shown in its inventory.

Therefore, where state laws levy a tax on the *sale* of merchandise, the Tax Commissioner is obligated to prove actual sales to account for the assessment of taxes, and the Commission can not levy taxes based on production records. This court said:

"In the instant case, the statute levies a tax upon sales, but the Tax Commissioner assessed a tax upon production; hence this act was not within the limits of the jurisdiction conferred by law and no presumption of validity attached thereto."

It is quite apparent that, according to this late and leading higher court decision, *no* tax collector or commission may collect taxes based on production records where the state law specifically bases taxes on sales. The tax commission must prove that the production recorded equals the sales recorded before it may collect taxes based on production records.



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TRAFFIC News Digest

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 80111 (1)—Sand (except blast, core, engine filter, fire or furnace, foundry, glass grinding or polishing, loam, moulding or silica), carload minimum weight 90 per cent. of the marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Montezuma, Ind., to Springfield, Ill., 70 cents per net ton.

Docket 80125 (2)—Slag (refuse product of lead and zinc furnaces, having no commercial value for further extraction of metal) other than granulated, not screened, in bulk in open-top cars, carload minimum weight 90 per cent. of the marked capacity of the car, except that when car is loaded to full visible or cubical capacity, actual weight will apply. Establish on, from Hillsboro, Ill., to Wabash, Ind., 160 cents per net ton.

Docket 80132 (2)—Crushed stone, in open-top cars, minimum weight 90 per cent. of marked capacity of car, except that when cars are loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Speed, Ind., to New York City C Stations, viz.: Zionsville, Ind., 121 cents; Lebanon, Ind., 127 cents; Colfax, Ind., 132 cents; Crane, Ind., 138 cents; LaFayette, Ind., 143 cents; also to C. I. & L. stations, viz.: Carmel, Ind., 121 cents; Sheridan, Ind., 127 cents; Cyclone, Ind., 132 cents; Rossville, Ind., 138 cents; Yeoman, Ind., 143 cents; Monon, Ind., 149 cents per net ton.

Docket 80134 (2)—Sand and gravel, carload, as described in Rule 15, description A, I.C. Railroad tariff 13321-I, minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight applies. Establish on, from Riverton, Ind., to Boonville, Ind., 121 cents per net ton.

Docket 80140 (1)—Sand, (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing loam, moulding or silica), in open-top cars only, carload minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Wolcottville, Ind., to Maumee, Brailey, Delta, Wauseon, Eckley, Elmira and West Unity, O., 75 cents per net ton.

Docket 80145 (1)—Limestone (unburned), ground or pulverized, in straight or mixed carloads, minimum weight 60,000 pounds. Establish on, from Bloomington, Ind., to Central Freight Association destinations, rates as shown in Exhibit F.

EXHIBIT F

Proposed (Representative) rate to:

Abingdon, Golden, Sterling, Sterling (Rock Falls), Stillman Valley, Ill., Charlotte, Mich.	$2.48
Aledo, Alexis, Algers, Chadwick, Gilchrist, Ill.	2.59
Altamont, Tuscola, Ill.	1.76
Buffalo, N. Y.	3.47
Caseville, Mich.	3.03
Casey, Charleston, Grayville, Greenup, Ill.	1.65
Cassopolis, Mich., Chester, Goreville, Streator, Chenoa, Ill.	2.15
Centralia, Gilman, Ill.	1.93
Champaign, Sullivan, Tolono, Urbana, Ill.	1.82
Cherry, Genoa, Ill.	2.37
Chillicothe, Churchill, Sugar Grove, Thebes, Toluca, Ill.	2.26
Clifford, Mich.	2.92
Clinton, Taylorville, Ill.	2.04
Greenville, Mich., Stockton, Ill.	2.70

Supplement 1 to W.D.A. 79895 (2)—Limestone, ground or pulverized, unburned, minimum weight 60,000 pounds. Establish on, from Conneaut, O., to various points in Pennsylvania, Ohio, New York and West Virginia (too numerous to reproduce), rates on basis of I.C.C. docket 25220, carrier's revised scale.

Docket 80149 (2)—Stone, crushed, in bulk in open-top cars, carloads minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from North Vernon, Ind., to Amity, Ind., 77 cents; to Franklin, Ind., 83 cents per net ton.

FROM CENTRAL FREIGHT ASSOCIATION TERRITORY TO SOUTHERN FREIGHT ASSOCIATION TERRITORY

Docket 80170 (1)—Gypsum, crude or crushed (not ground), in bulk, carload minimum weight 80,000 pounds. Establish on, from Grand Rapids, Mich., to North Chattanooga, Tenn., 440 cents per net ton.

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 80191 (2)—Stone, carload, viz.: Crushed, broken, chats, etc., as described in Item 20, I.C. Railroad tariff 13321-I, minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight applies. Establish on, from Rosiclare, Ill., to Evansville, Ind., 145 cents net ton.

Docket 80192 (2)—Cement, viz.: Common, hydraulic, masonry, mortar, natural or Portland, carload minimum weight 50,000 pounds, unless marked capacity of car is less, in which case marked capacity of car will be the minimum weight, but not less than 40,000 pounds; also cement clinker, carload minimum weight 50,000 pounds. Establish on, from Middle Branch, O., to Cortland, O., 9½ cents.

Docket 80193 (2)—Limestone, ground or crushed, unburned, carload minimum weight 60,000 pounds. Establish on, from Prairie du Rocher, Ill., to Charleston, W. Va., 358 cents net ton.

Docket 80198 (2)—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) and gravel, carload, in open-top cars, minimum weight 90 per cent. of the marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Irving, N. Y., to East Aurora, N. Y., 110 cents per net ton.

Docket 80204 (2)—Limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds. Establish on, from Hillsville and Shaw Junction, Pa., to Republic, Ky., 303 cents per net ton, via established routes, subject to Ex Parte 148 increase (suspended).

ILLINOIS FREIGHT ASSOCIATION DOCKET

Docket IRC 511-379—Sand, viz.: blast, core, engine, glass, etc., carload minimum weight 90 per cent. of marked capacity of car except that when car is loaded to full visible capacity, actual weight will apply, but not less than 40,000 pounds, from Ottawa and Utica, Ill., to Joliet, Ill. Present—97 cents net ton. Proposed—88 cents net ton.

Docket IRC 511-380—Sand, viz.: blast, core, engine, grinding, moulding, etc., carload minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full visible capacity, actual weight will apply, but not less than 40,000 pounds from Utica, Ill., to Batavia and West Batavia, Ill. Present—$1.79 net ton. Proposed—$1.24 net ton.

Docket IRC 511-383—Limestone, agricultural, in open-top cars, carload from Rivermines, Mo., to (representative):

	Proposed rates
Harristown, Ill.	*$1.37
Illiopolis, Springfield, Ill.	* 1.41
Iles, Jacksonville, Ill.	* 1.50

Present—Class or combination.

*Switching charges of connecting lines will not be absorbed at points of destination.

Docket IRC 511-411—Sand, except foundry, glass, molding or silica, and gravel, carload minimum weight 90 per cent, of marked capacity of car, except that when car is loaded to full visible or cubical capacity, actual weight will apply, but in no case will the minimum weight be less than 60,000 pounds, from Bloomington, Ill., to Thayer, Ill. Present—90 cents net ton. Proposed—83 cents net ton.

Docket IRC 511-384—Sand, except sand, moulding, bonded (naturally or otherwise), and except ground or pulverized sand), in closed equipment, also in open-top equipment, carload, from Essex, Ill., to various points in Wisconsin:

	Present		Proposed	
To (Representative)	A	B	A	B
Milwaukee, Wis.	138	187	NC	176
Racine, Wis.	127	176	NC	165
Kenosha, Wis.	116	165	127	NC
Beloit, Wis.	138	NC	NC	176

Column A—In open-top equipment.
Column B—In closed equipment.
NC—No change.
Meeting May 14, 1946, 10 a.m.

ILLINOIS FREIGHT ASSOCIATION DOCKET

Docket IRC 511-389—Agricultural limestone, as described in I. C. Tariff 13321-I, Section 3, from Krause, Ill., to Marissa, Ill. Present—45 cents net ton, Proposed—50 cents net ton.

Docket IRC 511-410—Crushed stone, etc. To establish rate of 75 cents per net ton on crushed stone, carload, from Joliet, Ill., to Winthrop Harbor, Ill. Also, to estab-

lish rate of 75 cents per net ton on sand and gravel, carload, from Joliet and Plainfield, Ill., to Winthrop Harbor, Ill., and rate of 70 cents per net ton on sand and gravel, carload from Spaulding, Ill., to Winthrop Harbor, Ill. Present—No commodity rates in effect.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

Docket 66572 (2-R)—To establish rate of $57.00 per car (See note) on crushed stone (trap rock), from Westfield, Mass., to East Boston, Mass., in lieu of present rate of $1.21 net ton, published in N.Y.C. Railroad Tariff 1910 I.C.C. 342.

(Note: Cars must not be loaded above the marked load limit. When cars are weighed at the request of shipper or consignee, there will be an additional charge of $1.49 per car for weighing. To expire with December 31, 1946, unless sooner cancelled, changed or extended. Reason: To establish commodity rate to secure rail movement in competition with available movement from nearby quarries by truck.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Docket 38954 (2)—Cement and related articles, Texas to Texhoma, Okla. To correct rates to Texhoma, Okla., which are now off basis. Proposed rates are on Docket 15151 Scale III formula and are 1 cent lower than present rates. Proposed rates are as follows:

Cementville, Longhorn, Dittlinger,
New Braunfels .....30 cents
Dallas .....24 cents
Fort Worth, North Fort Worth...23 cents

Docket 38956 (1)—Sand and gravel, Crow Creek, Ark., to Memphis, Tenn. To establish a rate of 60 cents per ton of 2,000 pounds with switching charge at Memphis, Tenn., in addition on gravel and sand, carloads, from Crow Creek, Ark., to Memphis, Tenn., in lieu of present rate of 88 cents per ton.

Docket 38970 (1)—Gypsum rock, Bucher, Okla., to Navarro, Pa. To amend SWL Tariff 3-B, Agent D. Q. Marsh's I.C.C. 3594, establishing rate of 37 cents per 100 pounds on gypsum rock, mine run or crushed (not ground), carload minimum weight 100,000 pounds from Bucher, Okla., to Navarro, Pa.

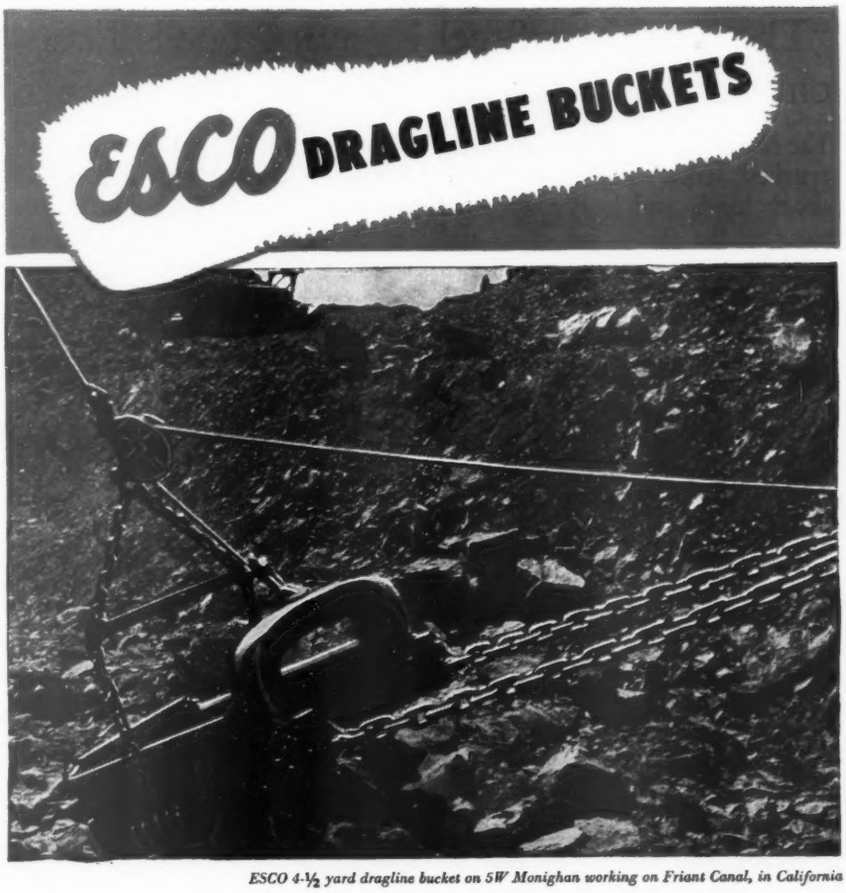
Docket 39048 (2)—Aplite rock, crushed or ground, Piney River, Va., to Laredo, San Antonio and Three Rivers, Tex. To establish rates of $11.55 to Laredo, Tex., and $10.67 to San Antonio and Three Rivers, Tex., from Piney River, Va., on aplite rock, crushed or ground, carloads, minimum weight 80,000 pounds.

TRUNK LINE ASSOCIATION DOCKET

Docket 43453 (shippers)—Crushed stone and screenings, in straight or mixed carloads (will not include agricultural limestone or ground limestone, unburned, fluxing stone or firestone; or stone coated with oil, tar, asphaltum or similar bituminous materials), minimum weight 90 per cent. of marked capacity of car, etc., from Baltimore (Woodberry), Md., to Hagerstown, Md., $1.32 per net ton, in lieu of current 6th class rate of 17 cents per 100 pounds. Reason: Comparable with rates applying from and to other points.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket E-41-738—Sand, as described in Item 25, Western Trunk Line Tariff 41-A,



ESCO 4-½ yard dragline bucket on 5W Monighan working on Friant Canal, in California

repeaters in performance... repeaters in sales...

When construction men, year after year, make repeat purchases of *ESCO* dragline buckets, it means just one thing—

ESCO dragline buckets stand up under hard service, do a better job of digging, last longer, with less trouble and maintenance cost.

Peter Kiewit Sons' Co. proved this on their Friant Canal job. This is one of the toughest jobs anywhere—with miles of extremely abrasive rock which, as Superintendent Wasson says, "Just beats the devil out of the bucket."

The performance of the first *ESCO* bucket on this job sold a second which, too, is taking daily punishment, increasing production, cutting costs.

ESCO dragline buckets are designed by practical construction men, based upon the principle of maximum strength without excessive weight.

All wearing parts, including rigging, are made of manganese steel, grow harder and tougher the more they work. Integrally cast teeth for maximum digging efficiency. No bulky tooth holders. Three weights, medium, standard, heavy.

For full information on *ESCO* dragline and dipper buckets see your nearest *ESCO* representative or write us direct.

ELECTRIC STEEL FOUNDRY

SPECIALISTS IN APPLIED METALLURGY

2141 N. W. 25th Avenue • Portland 10, Oregon

Offices and Warehouses

SEATTLE, 4 2724 First Ave. S. Elliott 4161	HONOLULU, 5 814 Kapiolani Blvd. Phone 6486	NEW YORK, 17 Graybar Building Lexington 28958	SAN FRANCISCO, 7 699 Second Street Douglas 8346
SPOKANE, 8 121 S. Monroe St. Main 5530	LOS ANGELES, 11 4600 Pacific Blvd. Lucas 7251	CHICAGO, 1 221 N. LaSalle St. Dearborn 2284	EUGENE, ORE. 1991 Sixth Ave., W. Phone 5012

IN CANADA— *esco* LIMITED, 1084 Homer St., Vancouver, B. C. Telephone Marine 2343

"The Toughest Steel Known" Spells Economy in the Toughest Conveyor Service

The handling of sand, gravel and crushed rock imposes drastic shock loads and heavy abrasive wear on the chain, sprockets and buckets employed.

The toughness and abrasion resistance of austenitic manganese steel are qualities without which such equipment will be unnecessarily costly to maintain.

The two most important requisites in elevator and conveyor chain—durability and freedom from breakdown—find their highest development in Amsco Manganese Steel Chain. Having a test-bar tensile strength of 100,000 — 130,000 lbs. p.s.i. and a developed-in-service hardness up to 550 Brinell, combined with a tough shock-resisting body-metal, manganese steel chain withstands for long periods abuse that quickly destroys ordinary chain.

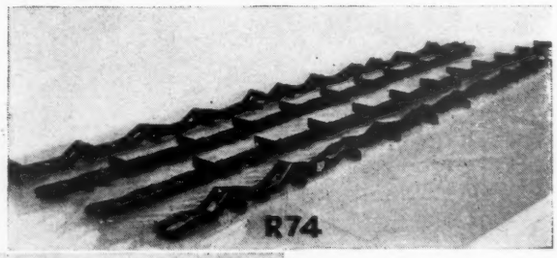
Examples of three, five and even ten-to-one service life for Amsco chain are on record.

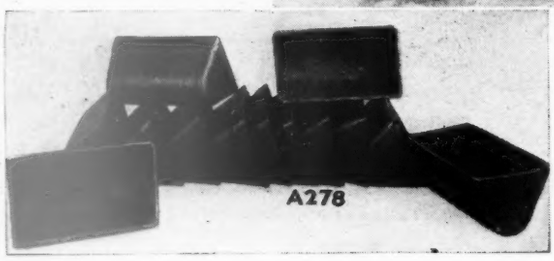
Sprockets, and idlers, too, of manganese steel have an assured service life greater than those of ordinary metal. They add length of life to transmission chains through taking on a smooth polish in operation. In a typical application where gray iron sprockets had to be replaced every few months, Amsco sprockets showed very little wear after three years in service.

Elevator buckets, also, are subjected to severe abrasive action and shock stresses. Amsco Manganese Steel Buckets have effected substantial economies in abusive applications. These buckets can be supplied in standard sizes, plain or punched.

Ask for descriptive Bulletins 742-CN and 842-WS.

Joliette Steel Limited, Joliette, Quebec, owned by American Brake Shoe Company, produces and sells Amsco Manganese Steel Castings in Canada.





R-74. 70' of No. 111 manganese steel conveyor chain with F-2 attachments for sand and gravel plant application.

A-278. A group of Amsco manganese steel elevator buckets punched for chain attachment.

R-285. A 9-toothed manganese steel sprocket wheel for an H-122 drag chain conveyor.

AMSCO

Foundries at

Chicago Heights, Ill.; New Castle, Del.;

Denver, Colo.; Oakland, Calif.;

Los Angeles, Calif.; St. Louis, Mo.

Offices In Principal Cities

AMERICAN MANGANESE STEEL DIVISION

CHICAGO HEIGHTS • ILLINOIS

AMERICAN Brake Shoe COMPANY

I.C.C. 3593, from Portage and Manley, Wis., to Danville, Ill. Proposed—Column A $2.42 per net ton (including X-123 increase); Column C $2.37 per net ton (includes X-123 increase). (By shipper.)

Docket E-11-116—Cement, carload, as described in Item 35-C of W.T.L. Tariff 133-J, Agent L. E. Kipp's I.C.C. No. A-3177, from Boettcher, Colo., to Saxman, Kan. Proposed—Establish rate of 32 cents per 100 pounds, on cement, carload, from Boettcher, Colo., to Saxman, Kan., which is on the basis of I.C.C. Docket 8182, Scale 4 formula.

Docket X-E-41-739—Crushed stone, carload, from Atchison, Kan., to Ceresco, Neb. Proposed—$1.28 per ton of 2,000 pounds. (By shipper.)

Docket E-8-636—Clay, common or fire, crude, not crushed, ground or processed, minimum weight 90 per cent. of marked capacity of car, from New Florence, Mo., to Hayward, Ky. Proposed—$4.51 per net ton of 2,000 pounds. (By shipper.)

Docket X-E-41-741—Sand, as described in Item 25 of Western Trunk Line Tariff 41-A, from Manley and Portage, Wis., to Grafton, W. Va., and Clarksburg, W. Va.

To Grafton, W. Va.		**To Clarksburg, W. Va.**	
Col. A.....	$3.96	Col. A.....	$3.85
Col. B.....	4.36	Col. B.....	4.24
Col. C.....	3.96	Col. C.....	3.85

Being proposed rates per ton of 2,000 pounds. (By shipper.)

Docket E-41-743—Sand, carload, from Portage and Manley, Wis., to Muscatine, Ia. Proposed—156 cents per ton of 2,000 pounds. (By shipper.)

Docket E-41-744—Sand, etc., carload, as described in Item 25 of Western Trunk Line Tariff No. 41-A, I.C.C. No. A-3593. Minimum weight as provided in Western Trunk Line Tariff No. 41-A, I.C.C. A-3593, from Millington, Oregon, Ottawa, Sheridan, Utica and Wedron, Ill., to Tell City, Ind. Proposed—In cents per ton of 2,000 pounds, Col. A, 275; Col. B, 303; Col. C, 275; (Columns A, B and C as described in Item 25 of Tariff). (By shipper.)

Docket E-41-745—Crushed rock and rip rap, carload minimum weight 90 per cent. of marked capacity, but not less than 50,000 pounds; from Sioux Falls, Dell Rapids and Spencer, S. D., to Cole Harbor, N. D. Proposed—$2.00 net ton. (By shipper.)

Docket D-11-117—Cement, viz.: hydraulic, Portland or natural; also other commodities named in Item 35-F, Supplement No. 67 to WTL tariff 133-J and Item 30-E, Supplement No. 49 to Western Trunk Line Tariff 132-J, carload, from Louisville, Neb., to all points in Missouri, Kansas and Colorado named in Western Trunk Line Tariff 132-J and 133-J to which rates are not now published from Louisville, Neb. Proposed—Establish rates based on the same scale and formula as was used in determination of rates from Superior, Neb., to the same destinations, viz.: I.C.C. Docket 8182 scales and formula. Representative points are shown below:

TO	Proposed rates in cents per 100 pounds
Harrisonville, Mo.	18
Higbee, Mo., Ft. Scott, Kan.	19
Springfield, Mo.	22
Arkansas City, Kan.....	21
Scott City, Kan.	26
Portland, Colo.	31

NEW MACHINERY and SUPPLIES

● Portable Asphalt Machine

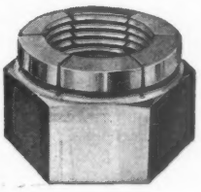
The continuous asphalt machine pictured above, manufactured by the Komb Drier Co. of Marion, Ind., is described as an entirely portable unit, operated by one man. It is 11 feet, 10 inches high, 25 feet long and 7 feet, 10 inches wide. Its weight is 8 tons; the drier is 6 feet by 10 feet and has a shell ⅜ of an inch thick. Other features are as follows: a continuous-type screw for mixing; two burners; a 45 hp. V8 gas engine. Its capacity is 20 to 40 tons per hour.

The aggregate enters at the front of the drier, passes through the inside cone, then returns to the front, where the elevator picks it up and dumps it into the mixing chamber. The aggregate is fed from reciprocating feeder plates, one for sand, the other for stone, according to specifications.

All moving parts are synchronized with one another except the asphalt pump, which is set by a 6 per cent. chart.

● Combination Nut

A combination lock and stop nut, known as "Flexloc," has been introduced by the Standard Pressed Steel Company, of Jenkintown, Pa. This nut is made in one solid piece, said to distribute the load evenly on all threads, including the three or four locking threads. The six radial slots provide the flexible, resilient sections which do the actual locking. The locking effect, according to the manufacturer, is realized regardless of the position of the nut on the bolt or stud. Repeated applications of the same nut are said to make it no less effective in its locking properties. Flexloc is available in steel, brass, bronze, or aluminum, in either S.A.E. or U.S.S. threads.



Lock nut

● Estimating Tables

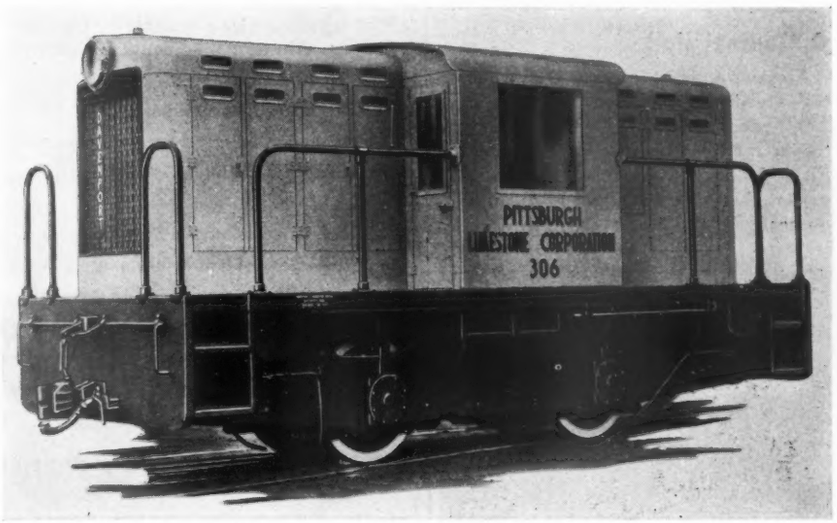
A loose-leaf book of estimating tables, covering practically every known and commonly-used type of masonry and frame construction, is now available for lumber and building supply dealers. Compiled by Albert F. Schaefer, vice-president of the Schaefer Bros. Builders Supply Company, Inc., of Rochester, N. Y., these tables are claimed to save time and expense and to eliminate errors in making estimates of the quantity of materials required and total cost for specific construction jobs. The subjects are arranged and indexed to assure quick, easy location of desired data. The loose-leaf feature permits the addition of pages, covering new materials and methods, which may be obtained from time to time in order to keep the tables up to date.

● For Materials Handling

The "Model IT4 Traxcavator" is the latest development announced by the Trackson Co. of Milwaukee. The model IT4, mounted on and powered by a Caterpillar model D4 track-type tractor, has a standard, 1-cubic-yard bucket, and is recommended for digging, excavating, grading, loading and materials handling. The mechanical hoist is said to be fast, positive and dependable in all weather conditions; it is driven through a V-belt drive from the front power take-off.

A combination loader and dozer.

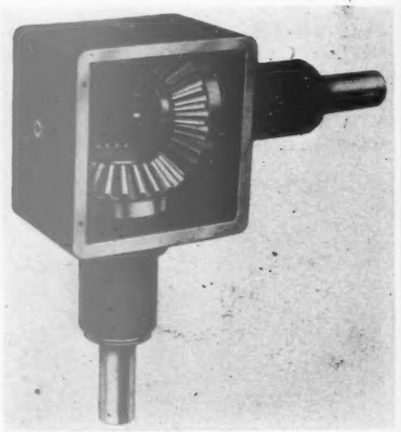
The bucket can be dumped from any point of the lift and has a digging range from 14 inches below the track line to 56 inches above; it is tilted back 30 degrees during the first part of the lift. A bulldozer blade replaces the bucket for 'dozing jobs.



This 35-ton, narrow-gauge Davenport diesel-electric locomotive was recently delivered to the Pittsburgh Limestone Corp. to meet the demands of an expanding operation. The unit is powered with two Hercules engines, two generators and two motors. It typifies the trend toward the quieter, more flexible characteristics of modern diesel-powered haulage units so widely used during the war by the government and many industrialists. Units of this type are said to be adapted for economical use on multi-shift operations. The builders are the Davenport Locomotive Works, a division of the Davenport Besler Corp., Davenport, Iowa.

● Gear Box

The Brooks Equipment Corp. of Hoboken, N. J., designers and manufacturers of flexible equipment, have recently released a series of new type miter gear boxes and brackets. Designed for standardization, economy, high efficiency, and ease of installation, the new product



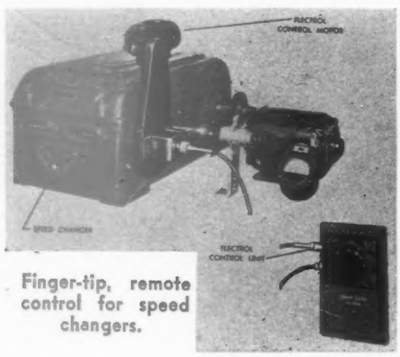
Miter gear box and brackets.

reportedly fills a need in the line of power transmission equipment. Strength and shock resistance characterize the fabricated steel construction, according to Brooks.

Extra long hubs are furnished to provide for generous self-lubricating "Oilite" bearings and an oil reservoir. Clamp brackets are designed to allow line-up in one place during installation. Oil-sealed and plain types are offered in shaft sizes ranging from ½- to 1½-inch diameter. Gear dimensions and horsepower ratings are in accordance with standard power transmission practice.

● Control Unit

Finger-tip, remote control of commercial speed changers is the job of "Flectrol," produced by the Yardeny Laboratories, Inc., of New York. In operation, Flectrol controls the rotation of a small motor which is used to adjust the pulleys or gears of the speed changer. Setting



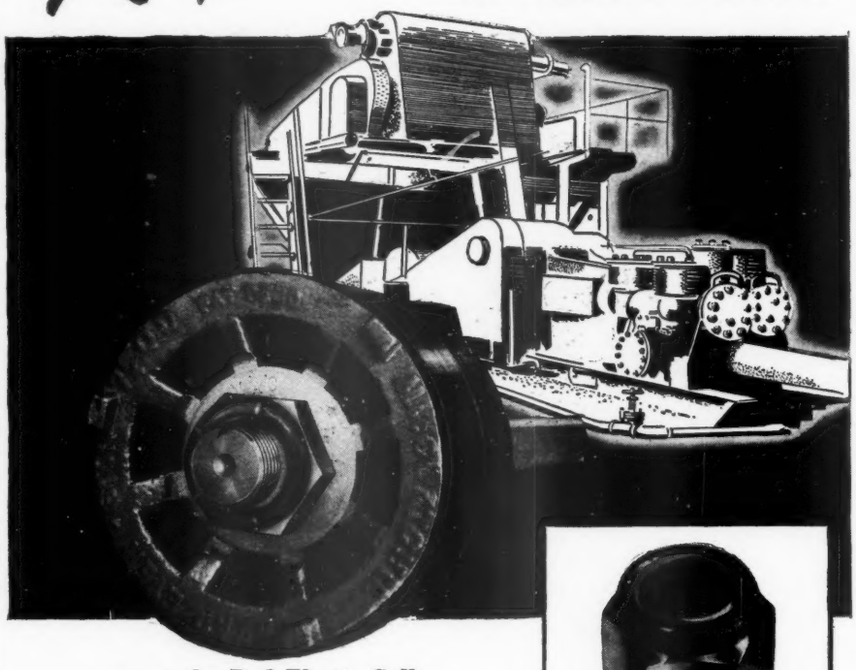
Finger-tip, remote control for speed changers.

the speed selector dial causes this motor to drive the adjusting screw until the output speed of the controlled device cor-

2,500 PSI

Reciprocating Action

ON SLUSH PUMPS



— yet the Red Elastic Collar

***protects permanently against* VIBRATION**

Vibration — caused by alternate suction and pressure that reached 2,500 psi — made complex trouble spots for the 1½" to 2" nuts that held slush pump pistons on the rod. Other types of *conventional* fasteners failed. ESNA Elastic Stop Nuts held permanently!

In addition to holding permanently against Vibration, ESNA Elastic Stop Nuts protected against Liquid Seepage. Abrasive mud could not get between the nut and rod to cut out the piston and core rod. They prevented Thread Corrosion. They prevented Costly Maintenance during piston replacement because they are self-locking, easily removable, and reusable over and over.

***Here's a challenge:* Send us complete details of your toughest bolted trouble spot. We'll supply test nuts — FREE, in experimental quantities. For further information or literature address: Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives and Agents are located in principal cities.**

The RED ELASTIC COLLAR

—denoting an ESNA product

. . . is threadless and permanently elastic. Every bolt — *regardless of commercial tolerances* — impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads — and eliminates all axial play between bolt and nut threads.

All ESNA Elastic Stop Nuts — *regardless of size or type* — lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.

ESNA TRADE MARK

ELASTIC STOP NUTS

INTERNAL WRENCHING · ANCHOR · INSTRUMENT MOUNTING · SPLINE · CLINCH · GANG CHANNEL

***PRODUCTS OF:* ELASTIC STOP NUT CORPORATION OF AMERICA**

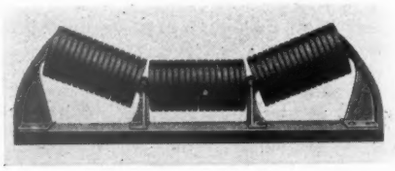
responds to the speed selected on the dial.

The dial, the only speed-indicating device required, may be calibrated in r.p.m., feet per minute, gallons per hour, etc.; it can be set instantaneously to any desired speed and the changer will follow as fast as the electric servo motor can drive the speed-adjusting screw. The remote control device is reportedly applicable to new or existing equipment of any type. It is claimed that any speed within the range of the changer can be selected with an accuracy of 2 per cent.

● Conveyor Idler

A newly-designed, impact-cushioning troughing idler for belt conveyors is now being manufactured by the Chain Belt Co. of Milwaukee. The Rex Style No. 35 idler is said to protect and greatly lengthen the life of the conveyor belt.

Each roll consists of a rubber cylinder vulcanized directly to the assembly



Impact-cushioning troughing idler for belt conveyors.

tube. The cylinder has multiple grooves moulded into it, deep primary grooves for maximum cushioning to guard against belt carcass rupture, and shallow secondary grooves to provide surface softness for protection against belt cover laceration.

Each roll is equipped for high pressure grease lubrication and is regularly furnished with a hydraulic type fitting.

Tests have shown a greater impact absorption capacity for this type of design than that of other impact types. The grooving reportedly permits the greatest possible deflection under impact without impairment of roll stability.

● Safety Shoes

The Hy-Test Division of the International Shoe Co., St. Louis, Mo., offers a line of safety shoes designed to furnish protection to workers in hazardous industries. The various types of shoes are scientifically constructed to meet all conditions which might cause injuries to the feet. Steel toe caps protect the toes from being crushed; sturdy counters brace the foot; special soles prevent slipping, keep out moisture, resist electric sparks and shocks, insulate against hot surfaces, etc. The composition soles furnished are particularly recommended by the manufacturers for workers in sand or gravel pits, mines or quarries or on rough concrete floors, cinders and rough surfaces, and for all outdoor work necessitating standing or walking on wet ground.

● Magnetic Separator

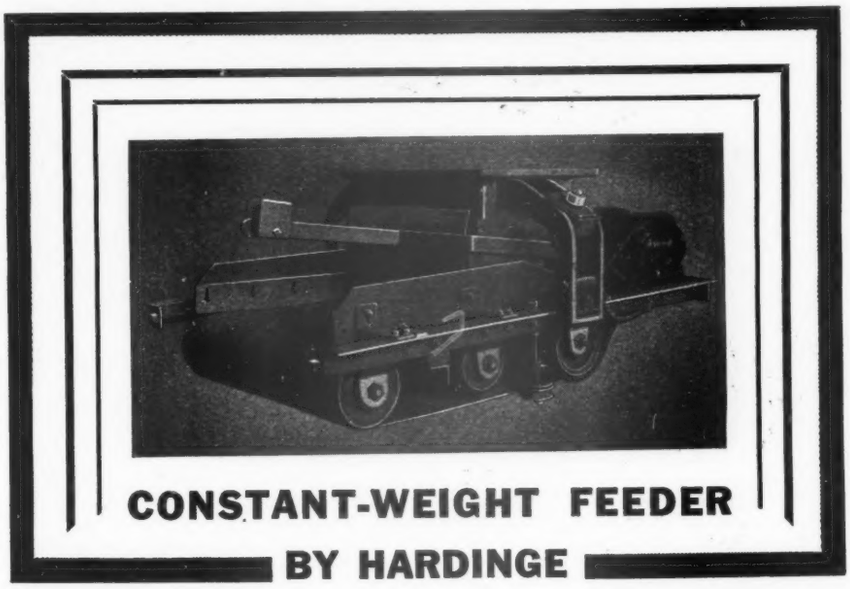
The development of a powerful, compact, non-electric magnetic separator with a working surface made entirely of stainless steel is announced by Eriez Manufacturing Company, Erie, Pennsylvania. The Eriez magnet offers a means of removing ferrous particles present in rock materials. Installed at any point where crushed raw rock or clay earth enters a chute or conveyor, this separator will attract and hold mangetic foreign bodies, preventing them from falling into the pulverizing or refining machinery.

The edge strips and center insulating strip of non-magnetic stainless steel prevent the unit from magetizing the steel on which it is mounted. The two pulling areas on each side of the center insulating strip are made of magnetic stainless steel. These magnets need no wiring, power being furnished by the Alnico steel magnet castings, and they are so made that their strength will last indefinitely, according to the company.

● Wire-Base Tire

A wire-foundation tire for off-the-road operations has been introduced by the Goodyear Tire & Rubber Co. of Akron, O. Fine metal wire of high-tensile strength is bonded with the rubber to form the foundation of this tire, which is designed for heavy-duty field service. Reports of tests indicate that this new product is strong, bruise-resistant and not susceptible to cutting.

Goodyear's method of constructing the wire tire, known as the "Hard Rock Lug," consists of integrating a layer of thin, strong tensile wire between two laminations of rubber. The first ply of rubber is placed on a building wheel, and rubber cement is added to insure ad-



CONSTANT-WEIGHT FEEDER
BY HARDINGE

• measures by weight, not volume
• maintains feed accuracy
• 1 pound to 1000 tons per hour

All variations due to changes in specific gravity, bulking, or size of material are eliminated. It affords automatic feed control for crushers, pulverizers, mixers, dryers, kilns, furnaces, and conveyors. Dustproof housings can be furnished, as well as remote-control and weight recording attachments. *Request Bulletin 33D.*

HARDINGE COMPANY, INCORPORATED • YORK, PENN.
NEW YORK 17—122 E. 42nd St. • 205 W. Wacker Drive—CHICAGO 6
SAN FRANCISCO 5—501 Howard St. • 200 Bay St.—TORONTO 1

hesion of the wire, which is put on by an automatic device. Cement is then spread on the wire before a second lamination of rubber is applied. The method of building from this point is much the same as for conventional tires.

● Feed Control

The Gai-Tronic Corp. of New York announces an electronic mill feed control known as the "Gai-trol" for tube, ball, bowl and other types of grinding mills. In cement plants, its use is said to assure more positive control over the fineness of the finished product.

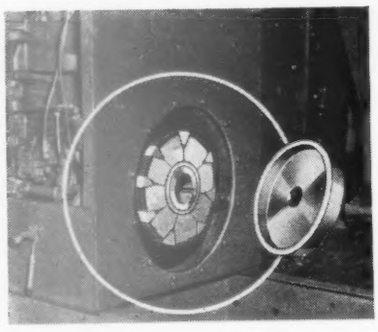
The equipment consists essentially of a load detector external to the mill and connected directly to the electronic equipment, which is contained in floor-mounted, self-supporting steel cabinet. A circuit from the electronic equipment in this cabinet supplies a variable-speed, direct-current, feeder-drive motor.

The circuit between the load detector and the feeder is claimed to be direct and entirely electronic, without relays, moving parts or mechanical speed change equipment. The speed of the feed motor is controlled continuously throughout a stepless range and without lag, cycling, intermittent action or over-and-under "hunting," according to Gai-Tronic.

● Automatic Clutch

Manufacturing and sales rights for the BLM "Auto-Centri" clutch have been obtained by the Hardinge Company, Inc., of York, Pa., from the Automatic Clutch Corp. of Canada, a subsidiary of the British Meter Company.

The automatic clutch, which is available in sizes from fractional to 5,000 hp. for any type of power drive, has been in service for several years. When installed with an electric motor drive, a standard squirrel-cage motor with across-the-line starting equipment can be used in place of a slip-ring or high-starting torque squirrel-cage motor. The manufacturer states that as the motor approaches full-load speed and maximum torque, the clutch picks up the load gradually, eliminating shock loads.



Automatic clutch for any power drive.

On drives using internal combustion motors, the clutch will automatically disengage the load when the motor is throttled to idling speed.

Three main elements—a driving hub, the driven hub, and the driving mechanism—make up the automatic clutch. Sectional liners on the drive body can be replaced through a slot in the driven hub without removing any parts of the clutch.

● Electrode Holder

The General Electric Company's new armor-clad (screw type), fully insulated electrode holder features a head which is completely enclosed in a sheath of aluminum armor. Designed to protect against weld spatter and the possibility of accidental contact with the welding circuit, the device accommodates electrodes up to and including ¼ inch in diameter. It is claimed that the holder makes possible the maintenance of a uniform melting rate down to a stub end. The threads of the push-up rod do not carry current. The width of the electrode slot limits the size of the electrode which can be inserted, thus tending to prevent overloading.

● Welding Chart

The "Selectrode" chart recently issued by the Hollup Corp., a division of the National Cylinder Gas Co. of Chicago, guides electrode users in the choice of the correct electrodes for a specific job.

The varicolored pages (seven shades) tell which electrode to use, suggest applications, show currents, positions, physical characteristics, etc. Included are electrodes recommended for mild, low alloy and stainless steels, non-ferrous and cast iron, and surfacing as well as gas welding rods.

CINCINNATI
CONVEYOR BELTS

Here's a belt that has stamina to do the heavy duty jobs . . . to carry BIG Tonnage and give a Low Belt Cost per Ton Conveyed.

CINCINNATI is a tough conveyor belt that can "take it" under grueling conditions. It's high resistance to gouging, abrasion and the strain of peak loads make it a belt that will stay on the job for a long time. On your next conveyor belt need get a veteran of the aggregate field . . . a CINCINNATI BELT.

CINCINNATI
RUBBER MANUFACTURING CO.
Cincinnati, Ohio

TRADE NOTES

P. W. Brown

The photograph reproduced on page 152 of the May issue of PIT AND QUARRY above the name of P. W. Brown was not a likeness of Mr. Brown. Through a regrettable error, we printed, instead, a picture of Frank Weir, who figures in a Personal Mention notice of this issue. We present, herewith, the reproduction of a fully-identified portrait of Mr. Brown, who recently became production director of the Tyson Bearing Corporation.

An announcement, from the American Manganese Steel Division of the American Brake Shoe Co., Chicago Heights, Ill., states that the company has discontinued manufacturing industrial pumps of all types smaller than 6 inches in size, as well as their line of vertical pumps in all sizes. The manufacture, sale, and servicing of these discontinued models has been taken over by the Nagle Brothers, Chicago Heights, Ill., the designers and original builders of these pumps.

Benjamin O'Shea has retired as chairman of the board of directors of Union Carbide and Carbon Corp. He will continue as a director and a member of the executive committee. The office of chairman of the board has been abolished with Mr. O'Shea's retirement.

C. E. Heintz

Charles E. Heintz, who has been general sales manager of Elastic Stop Nut Corp. of America, of Union, N. J., for the last two years, has been elected vice-president in charge of sales, it was announced by John R. Munn, president.

Mr. Heintz, a graduate of Stevens Institute of Technology and the graduate school of engineering at Harvard University, has spent many years in the sales engineering field.

Gordon Spice has been named executive secretary of the Internal Combustion Engine Institute, which was recently reactivated after being temporarily disbanded during the war. Mr. Spice was formerly supervisor of estimating and routing at the Dodge plant of the Chrysler Corp.

Frank McCulloch, assistant treasurer of the Air Reduction Co. of New York died on March 29 at a hospital in Pelham, N. Y., at the age of 55.

A joint announcement was made today by Arthur O. Dietz, president of C.I.T. and Saul Gottesman, president of Credit Utility Company, Inc., stating that the instalment portfolio of the latter had been acquired by C.I.T. Corporation. Effective immediately, C.I.T. will take over the servicing of all former accounts of Credit Utility Company, Inc.

All of the facilities of C.I.T. will be placed at the disposal of Credit Utility Company customers and accounts will be serviced through the C.I.T. offices located in New York, Chicago, San Francisco and Los Angeles. Former Credit Utility clients should refer to these offices for information and prompt attention regarding current and future financing transactions. The C.I.T. Corporation specializes in financing instalment sales in the machinery and construction equipment fields.

T. H. Fawcett

Announcement of the appointment of Thomas H. Fawcett as sales engineer for its Locomotive Division has been made by the Vulcan Iron Works of Wilkes-Barre, Pa. Before going with Vulcan, Mr. Fawcett was connected with the Baldwin Locomotive Works, serving successively as draftsman, designer, engineer and sales engineer in their Locomotive Division, for nearly 30 years.

During this period he was granted several important patents on improved features of locomotive design. Besides acting as Sales Engineer for the Locomotive Division of the Vulcan Iron Works, Mr. Fawcett will supervise an extensive program of expansion and standardization.

R. W. Eichenberger

R. W. Eichenberger, vice-president of Robins Conveyor, Inc., of Passiac, N. J., has moved to the Chicago office to supervise sales in the Western Division.

Mr. Eichenberger joined the Robins organization in 1910 and has served in sales and engineering work. He was associated for many years with the development of methods for handling materials, particularly for public utilities, by-products coke oven plants, and various branches of the steel industry.

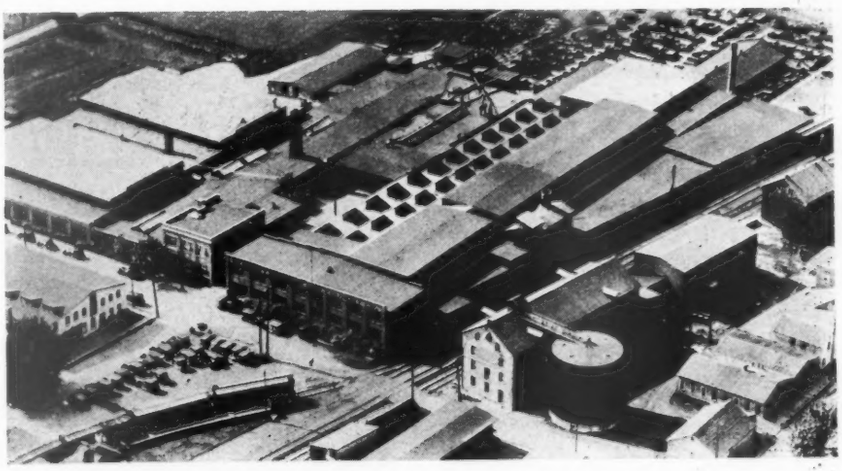
The Link-Belt Co. of Chicago recently announced the establishing of a sales office at Moline, Ill., in charge of Michael J. Parykaza, district sales engineer.

The Fuller Co. of Catasauqua, Pa., has acquired the Hershey Machine & Foundry Co. of Manheim, Pa., by purchase of all its capital stock, and will operate it as a wholly-owned subsidiary. The original Hershey plant was built about 80 years ago. The present plant comprises a modern foundry, equipped with both cupola and electric furnace; pattern shops; a core department; and large, modern machine shops.

A large proportion of Fuller Company equipment has been manufactured by the Hershey Machine & Foundry Company, for the past twenty years.

The acquisition of this plant will in no way affect the Fuller Company's activities in Catasauqua, where it operates a new plant with approximately 40,000 square feet of floor space.

At a recent meeting of the Hershey board of directors the following new officers were elected: J. W. Fuller, president; A. E. Douglass, executive vice-president; Harold C. Wolbach, secretary; Channing O. Davis, assistant to the president. J. Henry Simpson, vice-president, and H. B. Brandt, treasurer and assistant secretary, were re-elected.



Hershey Machine & Foundry plant acquired by the Fuller Company.

Two changes in key personnel of the American Hoist & Derrick Co. were recently announced by S. M. Hunter, vice-president in charge of sales.

R. J. Dervey

Raymond J. Dervey of St. Paul will take charge of the company's Pittsburgh office, relieving Ralph Thomson, who has been made manager of the New York office.

The appointment of Mark A. Woodward as director of the Cement, Lime and Allied Plants Division of Vulcan Iron Works, Wilkes-Barre, Pa., has been announced by B. S. Dowd, president.

Mr. Woodward formerly served as assistant chief engineer of the Lehigh Port-

M. R. Woodward

L. D. Holden

land Cement Co., manager of the Chicago Office, Cement Division, of Babcock & Wilcox Co., and chief engineer of the Marblehead Lime Co. of Chicago. He was also chief engineer and head of the maintenance and power departments of the Plum Brook Ordnance Works.

Leon D. Holden has been appointed assistant director of the Division.

He previously was associated with the New York Trap Rock Corp.; the Chicago Bridge and Iron Co.; the Lehigh Portland Cement Co. and the DuPont Co.

The Link-Belt Co. of Chicago has announced the appointment of J. Jess Richards, Jr., as engineer of sand and stone handling equipment for the Eastern Division and Byron K. Kartman as engineer of the Vibrating Screen Division.

Horace P. Phillips, who was until December 31, 1945 (his retirement date), Link-Belt vice-president in charge of production (Pacific Division), died on February 14 in San Francisco. He supervised the erection of the Link-Belt plant at 400 Paul Avenue, San Francisco, in 1941.

The appointment of J. T. Myers as assistant general manager of the Davey Compressor Co., Kent, O., was announced recently by S. V. Saginor, general manager. Mr. Myers has been affiliated with the Davey Compressor Co. since 1941.

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Hundreds of Installations . . Use Bradley Pulverizers

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AGRICULTURAL LIMESTONE
Cement Materials and all
Dry, Non-Metallic Minerals

CAPACITIES: 1 TO 50 TONS PER HOUR
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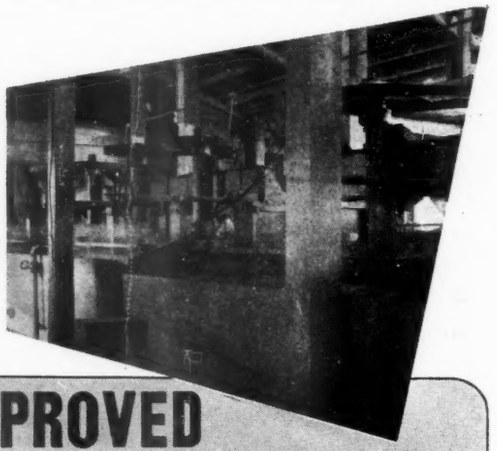

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Denver "Sub-A" Application

Standard,* JOB-PROVED *Denver "Sub-A"

Easily Adapted to Phosphate Flotation

Like many other successful phosphate operations, Coronet Phosphate Co. uses job-proved Denver "Sub-A" Flotation. Supercharging and double overflow, easily added to the Standard Denver "Sub-A", met all the requirements of this particular phosphate problem . . . giving the larger tonnage and froth removal capacity essential to high metallurgical efficiency in treating this fast-floating, coarse material. Two 4-cell No. 24 Denver "Sub-A's" handle 40-50 long tons per hour of −48+150 mesh material at 40% solids.

Three Repeat Orders for Denver Diaphragm Pumps

Open pit sluicing operation results in an erratic flow of pulp to processing plant. Coronet Phosphate uses 6" Duplex Denver Adjustable Stroke Diaphragm Pumps to positively control this feed to produce a constant flow of pulp to the flotation circuit.

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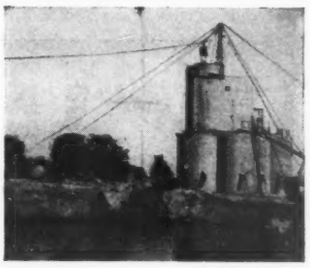

Sauerman Slackline Cableway above is lifting gravel from wide pit and delivering 110 cu. yd. an hour to plant at cost of few cents a yard.

Here is a typical Sauerman Scraper setup with elevated tail bridle stockpiling two sizes of rock at crushing plant.

CUT COSTS

by moving materials the SAUERMAN Way

Lower costs are the rule when Sauerman Scrapers and Slackline Cableways are used in sand and gravel excavation, stockpiling and other material-handling jobs where the long working range of these machines can be employed to advantage. Digging, hauling and automatic dumping of any bulk material become one continuous operation, entirely controlled by one operator. First cost is low; upkeep is simple. Wide range of handling capacities and operating spans.

Let Sauerman engineers study your digging or stockpiling problems. Their advice may save you money and will be given free. Write for catalog.

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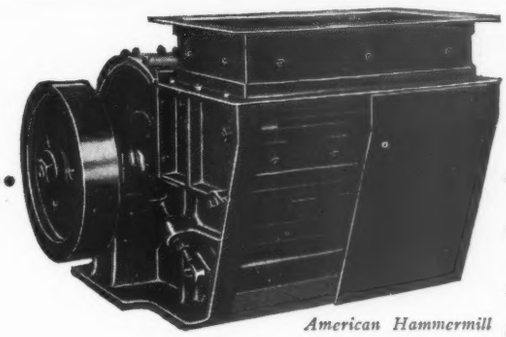

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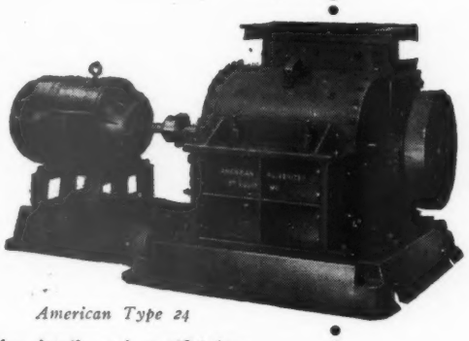
ADD FLEXIBILITY TO YOUR OPERATION

***with* AMERICAN CRUSHERS**

Americans are powerful, high tonnage crushers of sturdy sectional construction. They can be readily dismantled and relocated, with a minimum of headroom and area requirements. Their high tonnage capacities make them ideal for rapid feed from conveyors. There are American Swing Hammer Types and American Hammer Mills to fit your pit or plant operations, with capacities from 20 to 250 TPH.



American Type 24

Write today for details and specifications

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

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ST. LOUIS 10, MO.

C. E. Jones

Cornell E. Jones, formerly a major in the Army Corps of Engineers, has been named sales development Manager of the Caterpillar Tractor Co. of Peoria, Ill., according to an announcement by H. H. Howard, general sales manager of the company. Mr. Jones has served with county and state highway departments, the J. D. Adams Co., and International Harvester, both in domestic and foreign operations.

Mr. Jones takes over the duties of Kenneth F. Park, recently named to the newly-created post of engineering consultant on all matters pertaining to the earthmoving field.

At Tilton, N. H., plans for the erection of a modern manufacturing plant are scheduled to go into effect this summer, as announced by the Johns-Manville Corp. of New York. The new plant will be used for the production of asbestos insulation. A Johns-Manville research center is now being erected at Bound Brook, N. J. Both projects are included in the firm's $50,000,000 expansion program.

J. M. Demarest

An announcement made by M. E. Montrose, president of the Marion Steam Shovel Co. of Marion, O., states that the firm has changed its name to the Marion Power Shovel Co. after approval by the stockholders. The altered name is more truly descriptive of the diesel, gasoline and electric powered machines now manufactured by the company.

The firm is currently engaged in an extensive modernization and rehabilitation program. The factory phase of this program is under the direction of John M. Demarest, who was recently elected vice-president and works manager. Mr. Demarest was formerly associated with the International Business Machines Corp., the War Production Board and the Wright Aeronautical Corp.

Frank M. Urban has been appointed merchandise manager of the Mechanical Goods Division of United States Rubber Co., it was announced recently by Walter F. Spoerl, general sales manager of the division.

He began his career with United States Rubber Company in 1929. In 1944 was appointed assistant merchandise manager, the position he held at the time of his new appointment.

Appointment of the Wylie-Stewart Machinery Co., with offices in Oklahoma City, Okla., as sales agent for Lima shovels, cranes and draglines in the state of Oklahoma was announced by Paul R. Ehrgott, general sales manager, Shovel and Crane Division, Lima Locomotive Works, Inc., Lima, O.

C. W. Perelle

Charles W. Perelle, formerly vice-president in charge of manufacturing of Consolidated-Vultee Aircraft Corp., has been elected president of Gar Wood Industries, Inc., it was announced by John J. Bergen, chairman of the board. He succeeds Glen A. Bassett, retired.

As vice-president of Convair, Mr. Perelle was responsible for the production of more than 30,000 military aircraft, including the famous four-motored B-24 Liberator bomber, and was in charge of more than 100,000 employees in the company's eleven plants.

Dan K. Heiple has rejoined R. G. LeTourneau, Inc., as a field engineer in the installation department. The installation department, headed by Manager R. D. Evans, provides consultation service for owners and users of heavy earthmoving equipment.

Trade Literature

The pieces of literature listed below can be obtained direct from the manufacturers named, or requests can be addressed to Pit and Quarry's "Service to Readers" Department.

HEAVY-MEDIA SEPARATION PROCESSES. 47 pages. (Ore dressing notes.) Deals with fluorspar, magnesite and garnet, as well as with metals. The American Cyanamid Co., New York City.

HYCON HYDRAULIC POWER. The New York Air Brake Co., Hydraulic Division, New York City.

BOTTOM-DUMP MISSISSIPPI WAGON. Catalog describing models and sepecifications. M-R-S Manufacturing Co., Jackson, Miss.

A-C LORAIN LINERS GIVE YOU 2-WAY LINER LIFE! Bulletin B6355. 4 pages. The Allis-Chalmers Manufacturing Co., 575 Milwaukee.

RUBBER PRODUCTS. 18 pages. Listings and descriptions of Carlyle products—belting, hose and couplings. The Carlyle Rubber Co., New York City.

SLY INDUSTRIAL DUST CONTROL. Bulletin 100. 4 pages. The W. W. Sly Manufacturing Co., Cleveland.

AIRFUGE COMBINATION AIR SEPARATOR AND TRAP. Bulletin S-13. 4 pages. The Swartwout Co., Cleveland.

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Master Mix Surfaces
quickly laid
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immediate use
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give long service
Write for full information
KOTAL COMPANY
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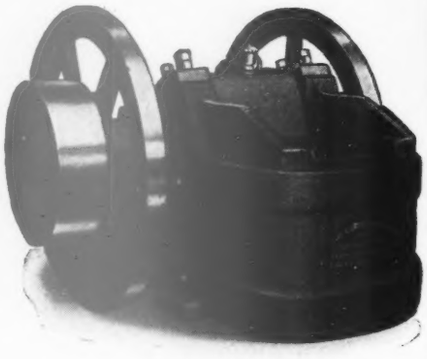
The Advanced All-Weather Aid in Building Better Roads

FARREL BACON
CRUSHERS
Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.



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PRECISION PROPORTIONING on All Points
Feeding
Conveying
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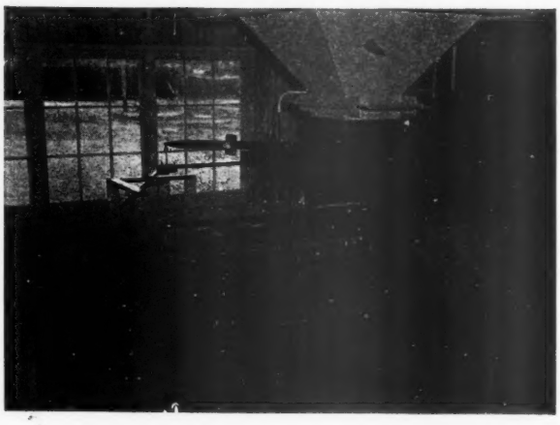
SCHAFFER POIDOMETER



The SCHAFFER POIDOMETER shown in operation above is one of several in the Ludington, Michigan plant of Dow Chemical Company. The Poidometer is feeding dolomite to rotary kilns.

Over 1000 of these automatic, high-speed, precision machines are now in use feeding and proportioning raw and finished materials and giving better low-cost production.

Available with remote control recording and operating devices, and total weight recorders.

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A DOZEN GOOD REASONS
FOR CHOOSING
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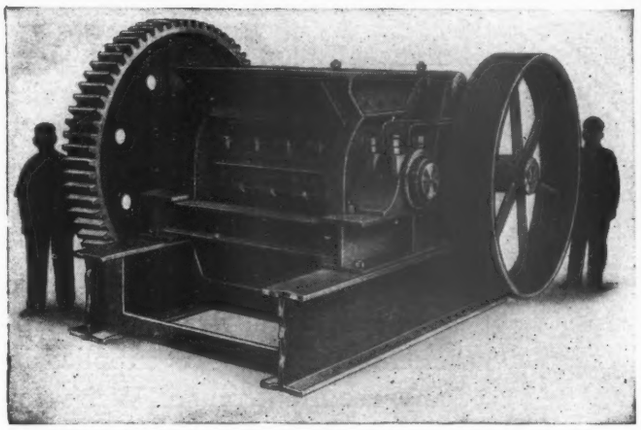

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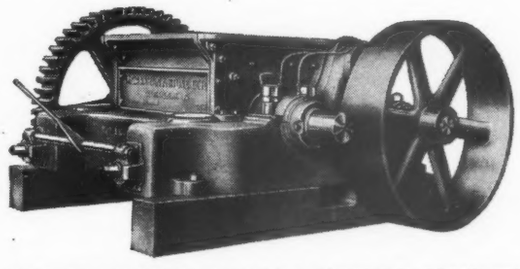

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Modernize your present plant with modern, dependable, low cost McLanahan equipment. Write for descriptive Bulletins today.

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Pit, Mine and Quarry Equipment Headquarters
Since 1835
HOLLIDAYSBURG, PENNSYLVANIA

AIR PLUS JAEGER COMPRESSOR

ENGINEERED FOR THE MOST MODERN GASOLINE OR DIESEL POWER

—AND BUILT TO OUTLAST ANY ENGINE 3-TO-1

Every equipment man "takes off his hat" to Continental, Caterpillar and International for the precision manufacture, the fuel economy, low upkeep, long life and complete dependability of their latest engines.

Jaeger Compressors are equipped with Continental, Caterpillar and International power — built to the same micro-precision standards, to operate at far slower speeds, cooler temperatures and only a fraction of the cost of engine upkeep, and to outlast their original power plants, plus a second, AND A THIRD.

For the LOWEST COST AIR you've ever known, equip with "AIR PLUS."

Sizes 60 to 500 feet—sold, serviced in 120 cities.

Why Buy an Obsolete Compressor When You Can Get a Jaeger?

- Air-cooled, 2-stage vertical compressors built in a balanced "W" with larger valves, interchangeable precision parts, full force feed lubricated.
- 20% to 30% slower, long-life piston speed, 100% efficient intercooling and automatic drainage.
- Massive main frame with recessed fuel tank, 30% to 50% larger air receivers, bigger tool boxes, life-time clutches, sectional radiators and intercoolers, electric starter, grouped controls, Timken bearing wheels, "Auto-Steer" axle, etc. all standard.

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Hendrick Perforated Plate in vibrating and shaking screens assures uniform mesh throughout unusually long screen life. Perforations of any specified size and shape afford continuously accurate sizing. Hendrick Perforated Plate — including Hendrick High Carbon, Heat Treated Steel for abrasion-resistance and special alloy steel for corrosion-resistance — is supplied in any required gauge. Write for "Perforated Plate" catalog.

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Architectural Grilles
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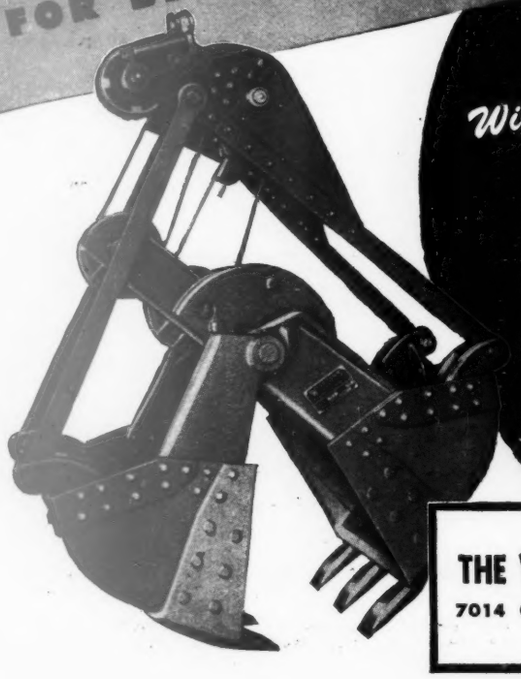
Follow the Leader
FOR BEST RESULTS



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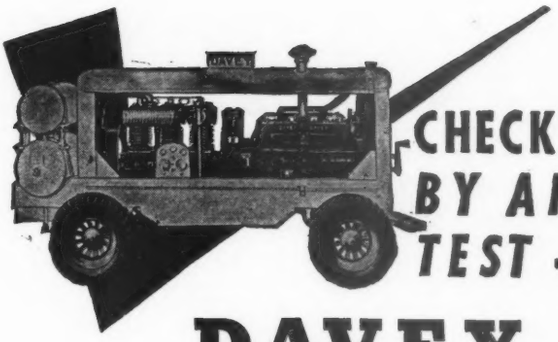

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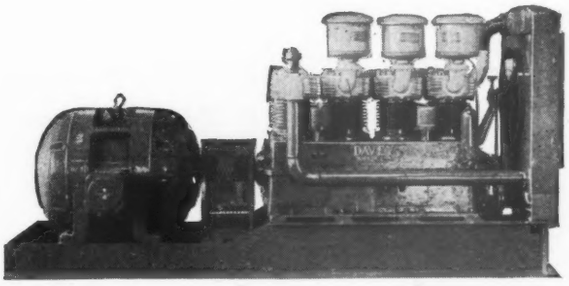
Our invitation to subject the Davey Compressor to the acid test of comparison is backed by the fact that it will deliver its rated output over a longer period of time than any other compressor, that its long-run cost is less.

Davey guaranteed-for-life valves are just one of the many reasons for the superiority of Davey Compressors. Davey conservative-speed operation is another big factor adding to its famous economy and long, trouble-free service. Add other Davey engineering features such as welded steel frame, aluminum alloy cylinder heads and automotive-type steering and you can readily see why we invite product comparison.



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The Davey Industrial Compressor is the quality leader among stationary air compressors because of the same exclusive Davey engineering features found in the trailer-mounted Air Aristocrat. For those tough pit and quarry jobs where maximum efficiency depends on a maximum air supply twenty-four hours a day, year after year, the Davey Industrial Compressor has no equal in sustained top performance, minimum maintenance and long-run economy.

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Write for Catalog E-172, which illustrates and describes the complete line of Davey performance-engineered Air Aristocrat Compressors, Auto-Air Compressors, Industrial Compressors, Heavy-Duty Truck Power Take-Offs and Pneumatic Saws, plus valuable pneumatic engineering data.

D-945-20M

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DEALERS IN PRINCIPAL CITIES

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WITH
CONCRETE FLOORS

Any house, whether built of concrete, brick or frame, can have the advantages of a firesafe, sagproof concrete subfloor. And nothing that a contractor can build into *a house of any material* will give the owner more in firesafety, structural stability and security or contribute more to durability, low maintenance expense, *low annual cost.*

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A Complete Meckum Designed and Built Dredge
Using the Meckum Steel Sectional Dredge Hull

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"ENGINEERED TO YOUR NEEDS"

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WE HAVE WHATEVER YOU NEED FOR YOUR DREDGE

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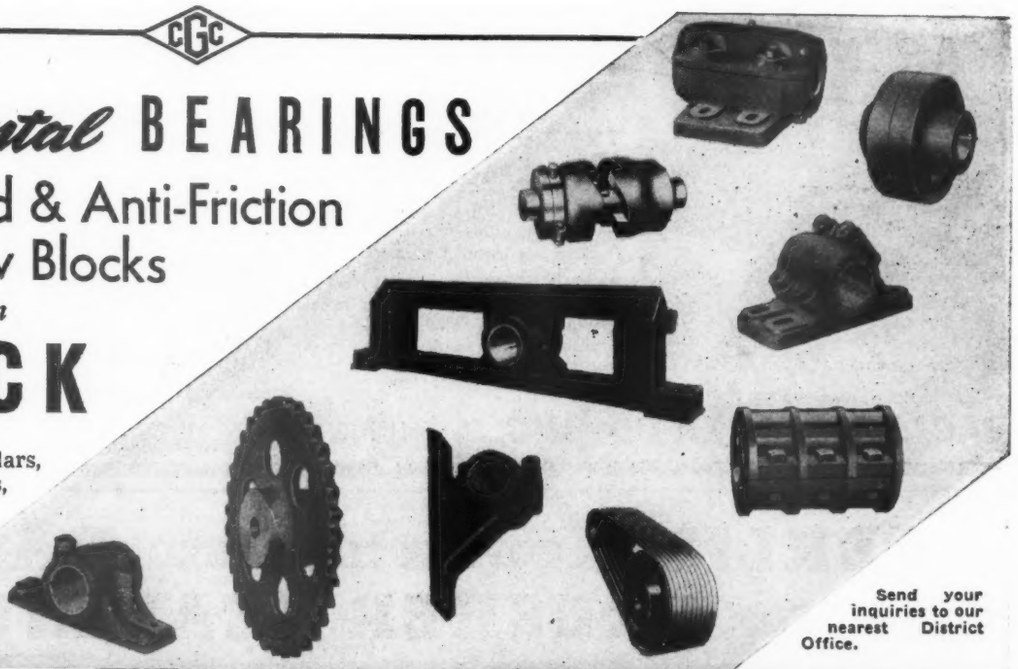
Babbitted & Anti-Friction
Pillow Blocks
from
STOCK

Also Shafting, Collars, Couplings, Clutches, Takeups and other lineshaft accessories.



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reduces "ONE-MAN" size stone to 1¼", ¾" or agricultural size in ONE OPERATION

Here's the all-purpose hammer type pulverizer for crushing agricultural limestone, concrete and road stone. WILLIAMS "Slugger" provides continuous, high-capacity production of uniformly sized material. Unit is extremely rugged and economical to operate. The ideal crusher for supplying a wide market demand with a small investment. Available in 7 sizes, portable or stationary models.

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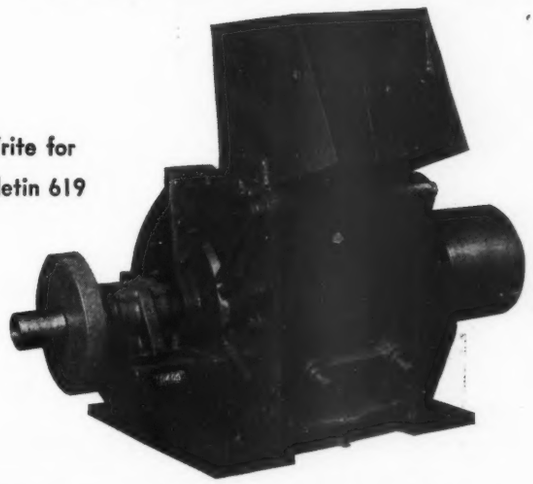

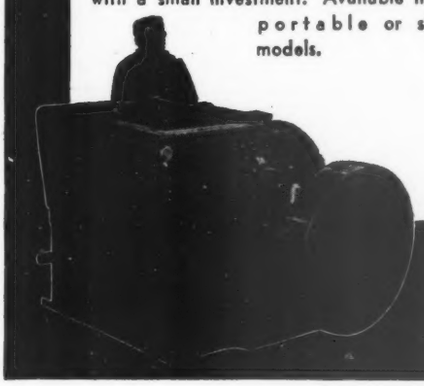

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802 St. Louis Ave. St. Louis 6, Mo.

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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
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"teams up" with the farmer by providing low-cost, uniformly reduced agstone to insure maximum crop returns.

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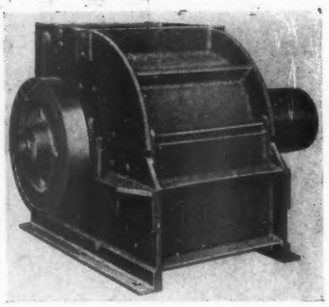

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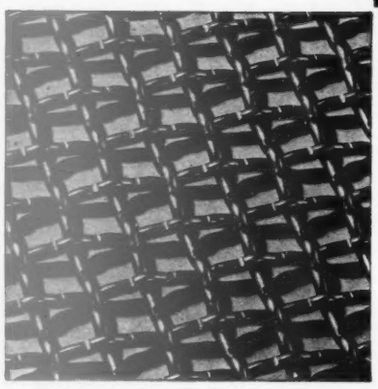

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All Sizes — Any Capacity

THE DAYBROOK HYDRAULIC CORP.

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Now! Two brand-new P&H electrodes to give you *longer* lasting surfaces—*less* maintenance costs. Use Abrasocote on parts requiring high resistance to impact and abrasion—and double their lives.

"Abrasocote" is available in two types — Nos. 10 and 20 — to give you the surface hardness jobs require. Easy to use, they operate equally well on AC or DC. Take advantage of their important time, money, machinery saving benefits. Get information from your P&H representative or write us.

"ABRASOCOTE 10"
Harder than No. 20, it's for parts subject to rolling or sliding abrasion, batter and impact. Applications include tractor treads, drive sprockets, cams, crusher hammer, etc. Rockwell C hardness 35-40.

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For high resistance to impact, heat, corrosion, abrasion. Deposit work hardens under impact. Use on high carbon manganese cast steels. Rockwell C hardness 25-35

P&H also makes other electrodes in all types and sizes — AC or DC — for welding all steels and for building up and hard surfacing.

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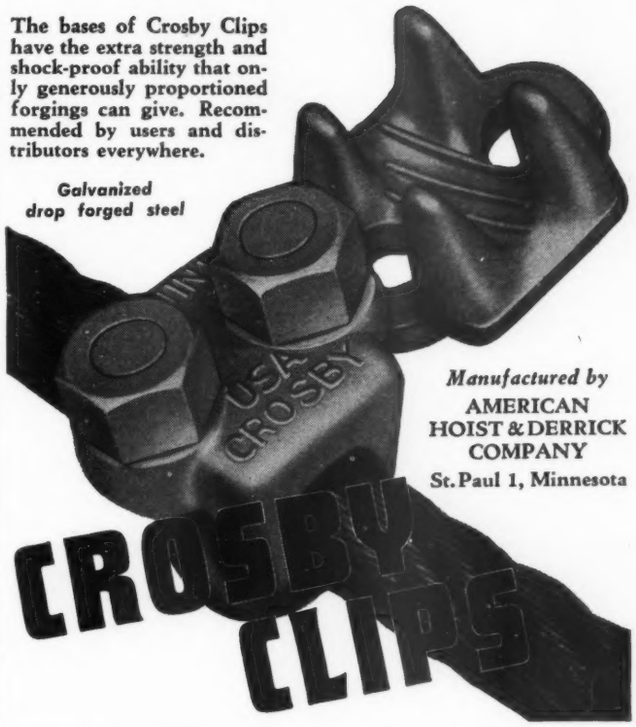
Galvanized drop forged steel



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St. Paul 1, Minnesota

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It Scoops
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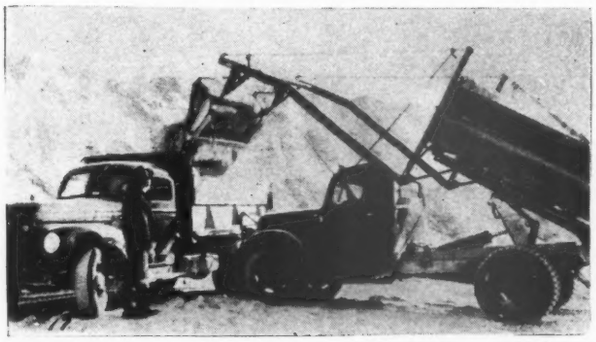
That's the
TRUK-LODER
for quick jobs

Fast as 15 or 20 shovelers — Loads a truck in 2 to 3 minutes
Fits on any type of truck



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Look to your Couplings!

"THE NECESSITY for flexible couplings in the non-metallic-mineral-industries is probably greater than in any other industry approaching size."—*Pit and Quarry.*

Extreme shocks—vibration—temperatures—all weathers—subject equipment to *severest* use—*rapidly wear it out* unless protected against misalignment, whip, backlash, etc.

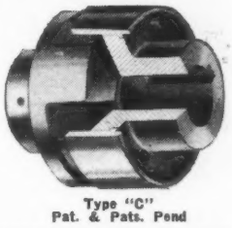
LOVEJOY L-R *Flexible Couplings*

Rugged LOVEJOY L-R Couplings for protection!

Free floating resilient load-cushions adjust to every emergency. Cushions always in sight—NO SHUT-DOWNS FOR CHANGING.

Get the facts! Use coupon below for full information on Lovejoy superiorities.

Type "C" shown, *new* shrouded coupling. Extra safeguard. 2 to 2500 h.p. Others 1/6 h.p., up.



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The impetus back of heavy industry calls for the correct combination of strength, toughness, elasticity and durability in the Wire Rope they will need 'for the big pull ahead'. That's why so many experienced wire rope users invariably specify "HERCULES" (Red Strand). They know it can be depended on *all the time.*

We'll be glad to answer your inquiries on any *Wire Rope requirement.*

A. LESCHEN & SONS ROPE CO.

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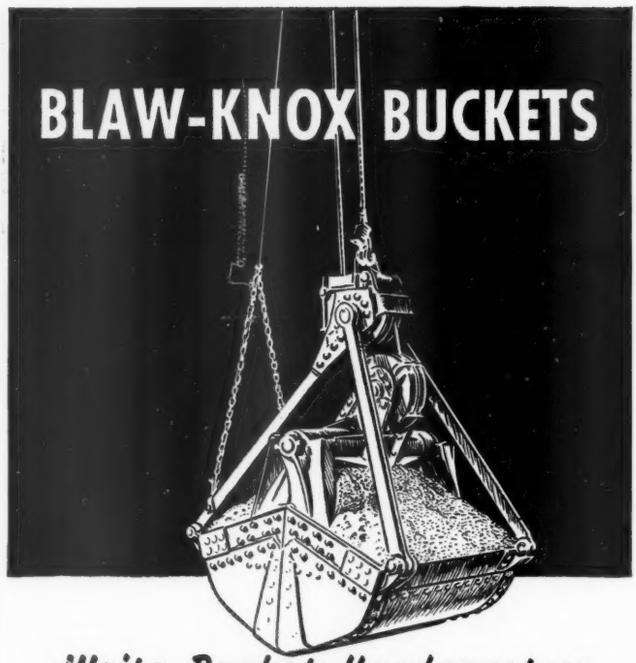
BLAW-KNOX BUCKETS



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BLAW-KNOX DIVISION of Blaw-Knox Company
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installs complete conveying equipment for sand and gravel washing plants

✓ *practically complete plant everything from a bucket to a*

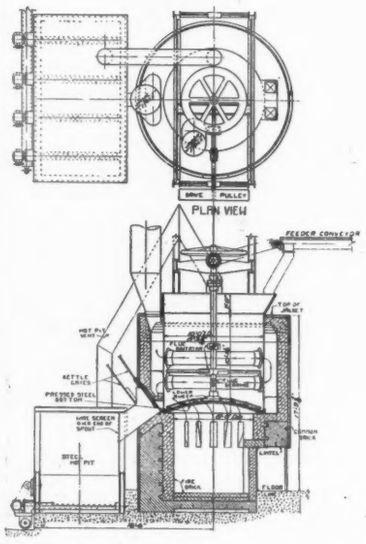
COLUMBUS engineers designed and built this large plant in southern Ohio. COLUMBUS elevators and conveyors are used throughout.

✓ *Write for Bulletin No. 155*

Experienced producers who "double-check" material handling equipment specify "the COLUMBUS Line" for durable and economical elevating and conveying machinery.

The COLUMBUS CONVEYOR COMPANY
Columbus, Ohio

EHRSAM CALCINING KETTLE . . . STANDARD *for the* GYPSUM PLASTER INDUSTRY



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Agitating mechanism

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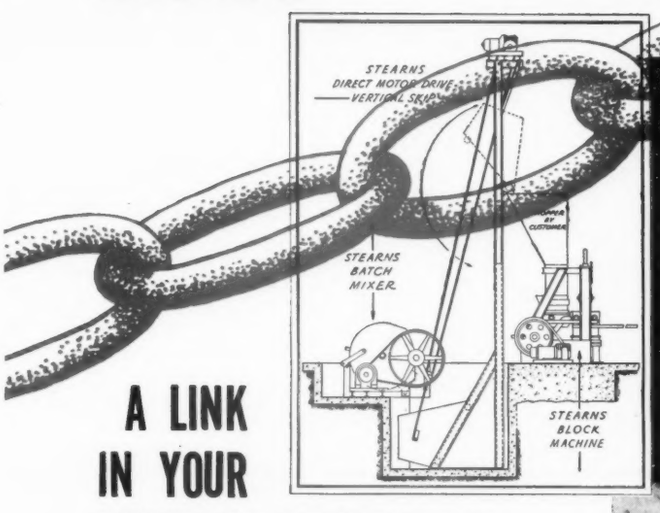
June, 1946

The CONCRETE MANUFACTURER

A Special Section of...



A LINK IN YOUR CHAIN OF PRODUCTION . . .

STEARNS SKIP LOADERS

form the most efficient method for conveying concrete from mixers to block machines.

Reduce cost by further mechanizing your production. The fully mechanized Skip Loader has proved a practical labor saving device indispensable in hundreds of concrete products plants. It is not one of these impractical complicated mechanisms that tend to prove costly in the long run.

It may be used in many ways. One method is illustrated above, where the Skip Loader carries the mixed concrete from mixer to block machine, both installed on the same floor.

Push button control starts the loaded bucket up and it automatically dumps its contents into the feed hopper over the block machine.

The Skip Loader is also successfully being used to hoist dry materials to elevated mixers or storage bins.

Whatever your plant layout, or the type of machinery now in use, consult us and let us show you how to put this useful device to work.

For sizes available and various methods of installation, write for a copy of our Skip Loader bulletin.

Performance
Speaks Louder than Words
(ASK ANY STEARNS OWNER)

A Few of Hundreds:

CHASE BUILDING PRODUCTS
Fort Worth and Dallas, Texas
Eight Skip Loaders

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Two Skip Loaders

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One Skip Loader

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STEARNS MANUFACTURING CO., INC., ERIE, PA.
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SUPERIOR CONCRETE PRODUCTS at no extra cost with Duraplastic Cement

Seven years of successful field performance on a variety of paving and building jobs have shown that Atlas Duraplastic air-entraining portland cement makes better concrete at no extra cost.

Noting this, a number of manufacturers of concrete block, drain tile, machine-made pipe, and silo staves of the tamped type have substituted Duraplastic cement for regular cement for their products with highly satisfactory results. Its use for concrete block, for example, shows the following:

1. **No added expense or unusual changes in methods.**
2. **Generally improved appearance, more exact edges and corners, truer dimensions, improved face texture.**
3. **Denser, more compact product.**
4. **Generally increased compressive strength.**
5. **Less breakage and less cracking in handling from machines to racks to kilns; fewer culls and throwbacks.**
6. **Lower absorption of water and greater resistance to passage of water.**

Atlas Duraplastic cement complies with ASTM specifications and sells at same price as regular cement. Send for further information. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., New York 17, N. Y.

OFFICES: New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St Louis, Kansas City, Des Moines, Birmingham, Waco.

PQ-D-33

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

A UNIVERSAL ATLAS PRODUCT

AIR-ENTRAINING PORTLAND CEMENT

Makes Superior Concrete Products at No Extra Cost

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The CONCRETE MANUFACTURER

JUNE, 1946

Vol. 9 No. 12

A MAGAZINE DEVOTED TO PRODUCTION OF CONCRETE PRODUCTS AND READY - MIXED CONCRETE

CCA

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J. A. CONVERSE

Mortarless Plant Under New Name, Plans Expansion

The concrete-block plant of the Mortarless Building Materials Company at Montebello, Calif., has been sold by Roy Schiefla to Ambrose O'Kelley, Jr., and David W. Eccles. The new owners, who have re-named the concern the O'Kelley-Eccles Co., have acquired additional land adjacent to the plant and plan to expand the business by stocking a complete line of building materials. With the installation of a third mortarless block machine productive capacity will be increased by 50 per cent.

Mr. O'Kelley and Mr. Eccles were stationed at Riverside, Calif., with a Q.M.C. unit of the U. S. Army. Observing the growth and opportunities in the concrete-products business in southern California, they planned, while still in the service, to purchase the plant. Now discharged, they are bending every effort toward a successful career in the building-materials field.

Eastern Firms Cut Output Because of Price Control

The McCrady-Rodgers Co. of Pittsburgh has announced that it will discontinue the manufacture of 10- and 12-inch concrete blocks because of continued Office of Price Administration price regulation. Several other Pittsburgh block makers also have stopped producing these sizes, and still others are contemplating similar action.

John McCrady, an executive of the McCrady-Rodgers firm, stated that the price schedules of 1937 are still in effect, although labor and costs have risen approximately 40 per cent.

"Veterans Only" Slogan Of Hialeah Manufacturers

In December, 1945, two World War II veterans, Ralph M. Jones and Joseph C. Kelly, formed a partnership and began operating a concrete block plant at Hialeah, Fla. The two partners, both former members of the 305th Signal Operations Battalion in Europe, are currently making only concrete blocks, but they plan to expand their products list to include pipe and septic tanks. When they attain full production, they expect to make 3,600 blocks a day.

The unique feature of this firm is that it advertises "We hire veterans only." The owners are fulfilling three urgent needs—they are giving employment to deserving ex-servicemen, making their own living and helping to ease the current shortage of building materials. They operate under the name of the Jones & Kelly Concrete Products Co.

Arkansas Firm Begins Making Concrete Items

A new firm, the Stockley Concrete Products Co., was scheduled to begin operating on May 15 in Marianna, Ark., where a new building has been erected. Hollow concrete building blocks, culvert tile, fence posts and other products will be manufactered. The new machinery, which includes a Gravely Vibrator machine, will make possible a daily output of 2,000 blocks.

New Canadian Firm Named Elgin Concrete Products

Elgin Concrete Products, a new company opened recently in St. Thomas, Ont., is being operated by Clement Allen. Production is reported in full swing, and the management anticipates enlarging its output with the addition of new equipment and machinery for making concrete and cinder blocks.

C. Donald Cameron, 55, a former concrete inspector for the State Highway Department of Ohio, died on April 21 in a Cincinnati hospital.

Coming Events

June 24-28, 1946 — *Buffalo.* Annual meeting, American Society for Testing Materials and exhibit of testing apparatus and related equipment.

October 7, 1946 — *Chicago.* 34th National Safety Congress and exposition, Stevens Hotel.

Committee Signatures Delay Pipe Makers' Price Relief Appeal

According to Howard F. Peckworth, managing director of the American Concrete Pipe Association, the organization's appeal to the Office of Price Administration for a suspension of price control over the concrete pipe industry must be handled by the sub-committee for concrete pipe of the industry advisory committee for ready mixed concrete and concrete products.

A tentative draft of a petition, now in the hands of committee members, who are scattered throughout the United States, must be approved before further action may be taken. Captain M. G. Roux of the Lock Joint Pipe Co., Ampere, N. J., will act for Chairman E. E. Brainerd, who is at present abroad.

New Portland Firm Makes 12,000 Pumice Blocks Daily

An $80,000 plant is slated to go into operation in Portland, Ore., on May 15 when the Smithwick Concrete Products Corp. machinery begins turning. S. Carl Smithwick of Spokane and Paul P. Klemens of Alpena, Mich., co-founders of the firm, have announced that they will manufacture all sizes of concrete blocks, beginning with 8- by 8- by 16-inch units at the rate of 12,000 per day. Materials used will be Oregon volcanic pumice (as a substitute for sand) and other products from the eastern part of the state.

Mr. Smithwick has been district engineer for the Portland Cement Association for the last 15 years, in charge of the eastern Washington and northern Idaho district. Mr. Klemens has represented the Besser Manufacturing Co., Alpena, Mich., makers of concrete block equipment since 1937.

Southern Producers Given Ready-Mix Price Increase

In accordance with the provisions of an O.P.A. ruling, producers of ready-mixed concrete sold in nine Southern states may now add to their ceiling prices the dollar-and-cent amount of their increased cost caused by the recent 10-cents-a-barrel increase in Portland cement ceilings (effective February 21, 1946). The action applies to Georgia, Alabama, Tennessee, Louisiana, Mississippi, North Carolina, South Carolina, Florida and a part of Virginia.

As in the action of November, 1945, which authorized the first 10-cent increase in the Portland cement ceiling, the O.P.A. allows the manufacturers of ready-mixed concrete to pass on the costs of the dollar-and-cent cement increase.

New Pensacola Industry Produces 2,500 Units Daily

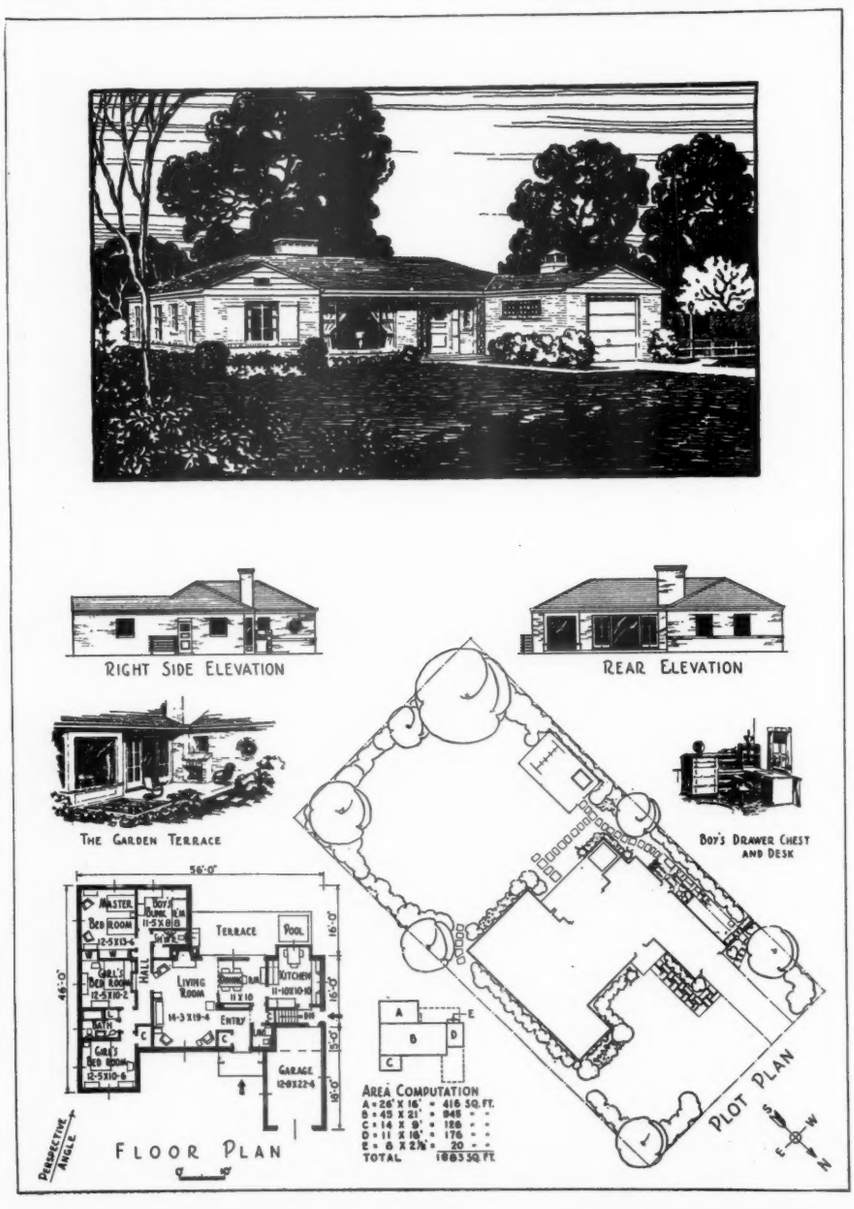
Among the post-war industries of Pensacola, Fla., is the B & B Builders Supply Co., which since February has been producing 2,500 concrete blocks per day. The proprietors, R. D. Bonham and E. E. Boone, plan to erect a building which will serve as a warehouse and also house the office and equipment.

Below: One of the winning plans in the Chicago Tribune's Chicagoland Prize Homes Competition, a design submitted by H. J. Uebelhack of Wilmette, Ill. (See page 172, Pit and Quarry, May, 1946.)

Special Consideration Given Block Industry In Priorities Ruling

In Priorities Regulation 28 (amended April 2, 1946), a Civilian Production Administration publication, information is given on securing a CC rating. The bulletin states that "Special consideration, not limited to bottleneck items, will be given to the needs of small business." Concrete block manufacturers will profit from the C. P. A. ruling which accords special consideration to "those who manufacture products included on the critical list."

Schedule I to Priorities Regulation 28, as amended April 10, 1946, indicates that manufacturers of concrete building units and makers of machinery for such products are considered in the "critical" classification and may apply for CC ratings.



Standard Hauling Contract Prepared by N.R.M.C. Assn.

THE legal obligations of ready-mixed concrete manufacturers who rent trucks which are driven by their owners have caused considerable misunderstanding and concern. The relationship between the renter and the truck owner in such cases involves important problems, such as compliance with the provisions of the wage-hour law (Fair Labor Standards Act), the social security law and transportation-tax requirements. To assist ready-mixed-concrete manufacturers in avoiding the complications that result from an inadequate understanding of these problems, the National Ready Mixed Concrete Association, through its tax counsel, Robert Ash, has drafted a proposed standard hauling contract.

Vincent P. Ahearn, executive secretary of that association, has kindly made available a copy of the tentative agreement and this is reproduced in full below. The association is asking for comments on the provisions set forth in this proposed contract with the idea of making the final draft fully representative of the thoughts of ready-mixed-concrete manufacturers and others who are faced with owner-driver difficulties. Mr. Ahearn will welcome comments from any interested firm or individual irrespective of their membership or non-membership in the national association. Comments and suggestions should be sent to Vincent P. Ahearn, executive secretary, National Ready Mixed Concrete Association, Munsey Building, Washington 4, D. C. The text of the proposed agreement follows:

Proposed Standard Hauling Contract

Whereas, Standard Corporation (hereinafter referred to as Standard) desires to procure the transportation of certain property and materials, consisting of rock, sand, gravel, (list other products) and/or by-products thereof, and the undersigned trucking contractor (hereinafter referred to as the contractor) is willing, as an independent contractor, to furnish such transportation,

Now, therefore, in consideration of the premises and undertakings hereinafter set out, it is agreed as follows:

1. The contractor represents and warrants that he is engaged in the trucking business and owns.....trucks used in connection with such business.

2. The contractor further represents and warrants that he is the holder of all of the necessary State and/or Federal certificates or licenses which are required or necessary for him to conduct his business as a hauling contractor.

3. The contractor further represents that he is fully protected by workmen's compensation, public liability and property damage insurance, and will continue to be so protected during the term of this agreement, and does undertake and agree to hold and protect Standard free and harmless from and against any and all liability, loss, cost, damage or expense by reason of anything done or suffered by contractor hereunder.

4. It is mutually understood and agreed that Standard shall notify the contractor of the material or property to be transported, and of the time and location of the place to load the same, and of the place of delivery, all within a reasonable time prior to the date that delivery is required; that thereafter the contractor shall, with all reasonable diligence, cause such materials and property to be transported to the place indicated.

5. It is agreed that contractor shall not be required to transport any more materials than can be transported by contractor's equipment, but transportation for Standard hereunder shall take priority over any transportation by contractor for any other person, firm or corporation, and it is agreed by Standard that the truck or trucks of contractor will be given a place in the line with Standard's trucks of a similar size and the trucks of other trucking contractors of a similar size, to the end that contractor shall transport a share of materials to be transported for Standard by such type of truck proportionate to the number of such trucks so available for use.

6. It is mutually understood and agreed that Standard shall have no control over the truck drivers or any other persons used or employed by the contractor, nor shall Standard have any control over the route, method of hauling or transportation, or the detail or management thereof. It is further understood that the contractor shall cause such materials and property to be expeditiously and safely transported, and in doing so, shall, at his own cost and expense, furnish all necessary labor, equipment, gasoline and oil, repairs, other supplies, and all other things necessary to that end, and shall have full charge, control and responsibility over the manner and method employed, and shall pay all taxes levied in connection with such operations.

7. Contractor shall not be required hereunder to transport material other than rock, sand, gravel, (list other products) and/or by-products thereof.

8. Standard agrees to pay the contractor for the performance of hauling service in accordance with the following schedule:

[Insert schedule.]

9. It is understood and agreed that Standard shall pay the contractor in accordance with the above-listed schedule on the ..... day of each month for all hauling done in the previous calendar month.

10. It is understood and agreed that this contract shall terminate upon ....days' due notice by either party thereof to the other, or may be terminated by either party on one day's notice in event of breach hereof by the other.

11. It is understood and agreed by and between the parties hereto for himself or itself and any and all employees of either as a condition absolute and precedent to the making of this contract:

(a) That the said contractor herein shall stand solely in the capacity of an independent contractor;

(b) That the said Standard shall exercise no direction or control over any of the employees of the contractor or the manner in which any of the work or services hereunder to be furnished shall be performed; and

(c) That under no circumstances shall any of the employees of the said contractor be construed to be or have or exercise any rights or claims as employees of the said Standard.

12. The contractor further represents and warrants that during the terms of this contract he will comply with all laws, regulations and orders now effective or which shall hereafter become effective which govern his activities under this contract as an independent contractor.

In witness whereof, the parties hereto have caused this agreement to be executed this.....day of....., 194.....

Standard Corporation

By.....

.....

Contractor

Witnesses:

.....

.....

Mr. Ahearn has pointed out that it is probable that renters of trucks under such a contract will have to keep a record of the hauling done under it. As each load is taken out, a delivery ticket or similar form must be executed in quadruplicate —the renting concrete manufacturer (the Standard Corporation in the above proposed draft) retaining one copy, the hauling contractor one copy, the consignee receiving one copy, and the fourth copy being returned to the company as proof of delivery. In addition, the company should keep a sheet record, showing in separate columns the date, the delivery ticket number, the type of material hauled, the miles hauled, the rate or price, and the total amount. A copy should be given to the contractor when he is paid.

Canadian Firm's "Sideline" Becomes Profitable Concrete Block Business

another ON THE SPOT report

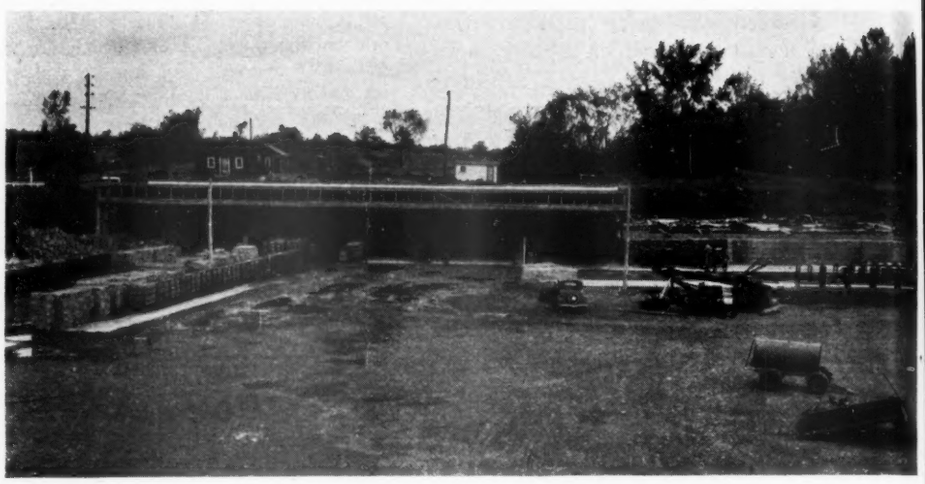
PROOF that opportunity still knocks, if one has the vision to see and is willing to work for it, is found in the success story of J. Cooke, Aldershot, Ontario, one of the leading concrete block manu-

By WALTER E. TRAUFFER

facturers in Canada. Mr. Cooke came to Canada from England in 1927 at the age of 18. He worked as a union carpenter until 1931 when he started his own hardwood flooring business in the nearby town of Burlington. This business prospered, so in 1935 Mr. Cooke added concrete block manufacture as a sideline, purchasing a small hand-operated machine. This business also grew, so a power tamper was installed in 1937 and another in 1940.

The delivery of this growing production then became a problem. The first truck was purchased in 1940; by 1942 there were 14, and now a fleet of 22 trucks is operated.

Early in his career as a producer Mr. Cooke realized the need for promotion of block sales and decided to build concrete block houses and small factory buildings and sell them to the public. This practice, he believes, did much to popularize concrete block construction in this area and it also provided an outlet for his products and help during otherwise slack periods. This has also become an important business in itself and other measures, plus the war industrial boom which created a critical housing shortage in the Hamilton area, have made it unnecessary to do any selling to keep the plant operating at capacity.



General view of the J. Cooke plant at Aldershot, Ont., Canada, showing the storage yard (left) and the building housing the block plant, garages, shops and offices (right).

The necessity of paying someone else a profit on the sand and gravel used in his blocks irked Mr. Cooke so in 1941 he opened up a pit and small block plant at Aldershot, a suburb of Hamilton.

In 1944 Mr. Cooke made the most important and courageous step in this success story. With still comparatively limited capital he started early in 1944 to build the present block plant at the Aldershot pit. In the summer he began moving in the equipment from the Burlington plant. One Besser Super Vibrapac machine was then installed and a second one is now on order. In spite of this expansion the backlog of orders now totals more than 700,000 blocks.

Further expansion and improvement of the block plant is planned and just now Mr. Cooke is developing another sideline, the manufacture of ready-mixed concrete. Two 3-cu. yd. Jaeger truck mixers are now on order. As soon as the necessary equipment is available he plans to rebuild and enlarge the sand-and-gravel plant. Another step will be the construction of a railroad siding to the plant to bring in bulk cement and take out blocks. Mr. Cooke also contracts grading, excavating and other kinds of shovel work and handles a complete line of building supplies.

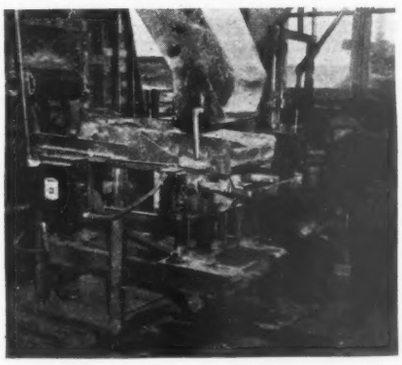
The plant at present is a 28- by

Below, left: A view of the screening plant.

Right: Close-up view of the main building.

220-foot two-story concrete and concrete block structure which houses the block plant, garages, repair shops, offices, a lunch room, and sleeping quarters for the men. Mr. Cooke maintains a modern apartment on the second floor.

The sand and pea gravel used in the blocks is hauled a few hundred feet from the gravel plant and is elevated to a 100-cu. yd. bin by a bucket elevator. The bulk cement is brought to the plant in covered trucks and is dumped into a 25-cu. yd. hopper from which a bucket elevator raises it to bins. The trucks which haul the cement from a shore distributing plant in Toronto haul blocks on the return trip.



One of the vibrators used to make "fill-in" special sizes of blocks.

A 2½-cu. yd. traveling batcher equipped with a Johnson beam scale weighs batches for the 50-cu. ft. Besser mixer over the Super Vibrapac and the 12-cu. ft. Stearns mixer over the two tampers which will be replaced by the second Super Vibrapac. The building is to be extended so that the same bins and batcher can be used for loading the truck mixers.

The Besser machine is fully automatic and is equipped with a pneumatic offbearer. It is used to make 4-, 8-, 10-, and 12- by 8- by 16-in. blocks, bricks, and backup tiles. The smaller machines, a Stearns Clipper stripper, and a Flam vibrator, are used to fill in when certain sizes are in demand and to make special sizes. The three machines, operating a 10-hr. day shift and a 12-hr. night shift, have produced at the rate of 320,000 standard 8-inch equivalents per month. The Super Vibrapac alone has made 115,200 bricks in 20 hours and also makes chimney blocks.

The new Besser machine will be a duplicate of the first and will be used part of the time to make cinder and slag blocks for which up to now no equipment time could be spared. Mr. Cooke believes that a large potential demand for these types of blocks exists in this area. Good cinders and slag are both available locally, the slag weighing from 30 to 32 lb. per cubic foot and having a high insulating value.

At present three Barrett-Cravens jack lifts and an Automatic Transporter electric lift are used to transport the loaded 60-block racks from the machines to the kilns or curing rooms. A second Transporter is on order. Two Clark Trucklift gasoline lift trucks transport the racks from the kilns to the yard and back to the machines. Also on order are a third Clark machine equipped with forks and a Stearns-Warren yard-loading unit.

There are now four 11½- by 124-ft. kilns and four more are being built. These have separate steam pipes for curing and heating for which steam is supplied by an 80-hp. stoker-fired boiler. The use of 4-oz. vacuum, a reducing valve and a vacuum pump prevent freezeups in winter. This boiler also provides the steam for heating the gravel bins and all buildings.

At the far end of the kilns there is a 135- by 64-ft. storage shed with a saw-tooth ventilated roof and sliding doors. This is equipped with sprays and two unit steam heaters. Additional curing in this building insures full curing of the blocks at all times and facilitates loading in cold weather.

The yard is partly paved and this will be completed as soon as possible using one of the company's finishing machines. Floodlights throughout the plants, sheds and yard make for safe and efficient night operation.

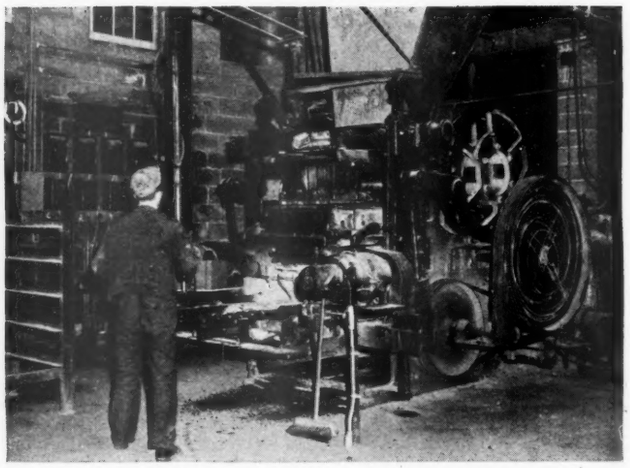
Shipments of blocks are now made by truck and by rail within a radius of about 125 miles to points as far away as London, Niagara Falls and Toronto. The trucks haul loads up to 25 tons.

The prices charged for blocks are based on a yard price of $14.00 per hundred for the standard 8- by 8- by 16-inch units. An additional charge for delivery is made, ranging from 5 to 9 cents per ton, depending on the distance.

All blocks are made to exceed the Canadian Inspection & Testing standards for Toronto. These require compressive strengths in excess of 1,000 pounds per square inch gross area and 2,000 pounds net area. Only standard portland cement is used and no admixtures are regularly used. Twenty standard blocks are made from one 87½-lb. sack of cement. On special orders a waterproofing paste is used.

The sand and gravel deposit is 25 feet deep over an area of 24 acres and its quality is as good as any available locally. It is quite clean and averages 33 per cent. gravel with very little of large size. A small shovel is used for stripping and loading but where digging is being done at present the deposit is so compacted that it is blasted loose with black powder. A P&H crane with a ¾-cu. yd. clamshell bucket loads

Left to right: B. Coleman, assistant manager; J. Cooke, owner and manager; Bob Henderson, superintendent.



Left: The 50-cu.-ft. mixer over the big block machine. Right: The automatic block machine, which can make 115,200 bricks in 20 hours.

trucks which carry the material a short distance to the plant. This consists of Sawyer-Massey primary and reduction crushers and two Dillon vibrating screens. This plant has a capacity of 50 cubic yards per hour and is operated nights and Sundays to keep up with the demand. The block plant takes all the sand and gravel up to ½-inch in size but the coarser gravel and the crushed gravel are sold.

The lunchroom and sleeping quarters were started up during the labor shortage of the war period when "floater" labor was all that was available except for a few key men. The lunchroom has become quite popular also with truck drivers and other travelers. A number of modern and comfortable houses are now being built for the more permanent and dependable type of help which is now coming back from war jobs. In all his varied activities Mr. Cooke now has 92 employees and more are being added.

The repair shop and garage are adequately staffed with mechanics, blacksmiths, etc., and the equipment includes two electric welders. Major and minor repairs are made to all equipment including the shovel, crane, trucks, loaders, bulldozers, etc. Much of the equipment is also built there, including the steel block racks, chutes, etc. A total of 350 racks are now in use.

Below, left: The electric lift, ready to transport a full load of blocks to the curing room. Right: One of the gasoline lift trucks running between the kilns and the yards.

N. California C. M. Assn. Distributes Building Code

Members of the recently organized Northern California Concrete Masonry Association, along with other producers and a number of individuals who are considering entering this field of activity, held a meeting at Sacramento on Friday, May 3.

Copies of the new Uniform Building Code were presented to members during the meeting. This book, used by most city and county building inspectors in Californa, is proving a valuable reference work for concrete-products makers in checking the requirements of building officials.

Ohio Pipe Manufacturer Marks 25th Anniversary

The Universal Concrete Pipe Co. of Columbus, O., is currently observing the 25th anniversary of its founding. Universal began its history in 1921 in a small building at New Martinsville, W. Va. Today it is an organization of 26 plants and two subsidiaries.

Virginia Products Firm Rebuilding After Fire

Repairs were going forward at the Washington Concrete Products Corportion plant in Arlington, Va., the day after a fire had caused damage estimated at $25,000. Flames destroyed much machinery and equipment in the main building.

John E. Borg, president of the Hoopeston Concrete Products Co. of Hoopeston, Ill., died unexpectedly at his home on April 7. Mr. Borg and the late Walter Trego founded the business several years ago.

Promoting the Farm Market for Concrete Products

Part III Conclusion

By WILLIAM M. AVERY

Farm Building Plan Service And Farm Construction Booklet

THE farm building plan service, including planographs and building instruction, and an excellent series of farm construction booklets

The first step in construction intended to emphasize horizontal joints. The mason rubs the vertical joint with a piece of concrete block to compact the mortar and obscure the joint.

for follow-up selling, round out the Portland Cement Association's plan for merchandising concrete masonry in the farm market. The building plan planographs show suggested layouts of poultry, hog and milk houses, dairy barns, farm shops and implement sheds. The 17- by 22-inch drawings help farmers to visualize what the finished structure will look like, and materially assist contractors and builders in preparing cost estimates.

The planographs are not intended to serve as final working drawings. They show, rather, typical designs which may be useful in preparing final plans adapted to local conditions and the particular application contemplated. Needless to say, all the drawings indicate plainly the desirability of using concrete masonry construction. Available now in planograph form are designs of the following farm structures: One-room (6-can) milk house, 20- by 40-foot straw-loft poultry house, 20- by 40-foot shed-type poultry hog house, a one-story gable-roof dairy barn, and a shop and machinery shed.

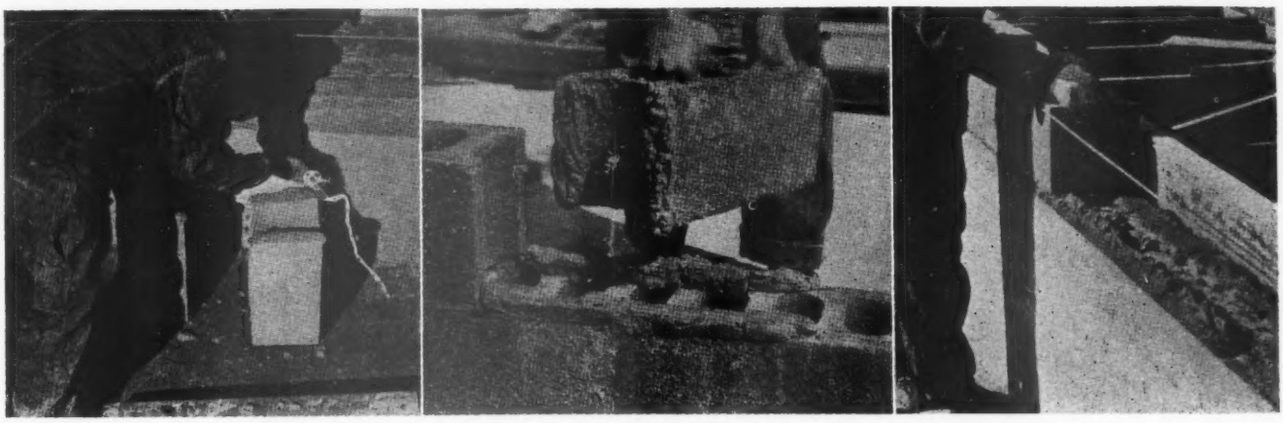
The building plan service has the obvious objective of making it as simple as possible for farmers to build with concrete masonry. The drawings have been prepared by competent designers who thoroughly understand the farmer's needs, and they are available at nominal cost to concrete products manufacturers who are interested in cultivating this lucrative market.

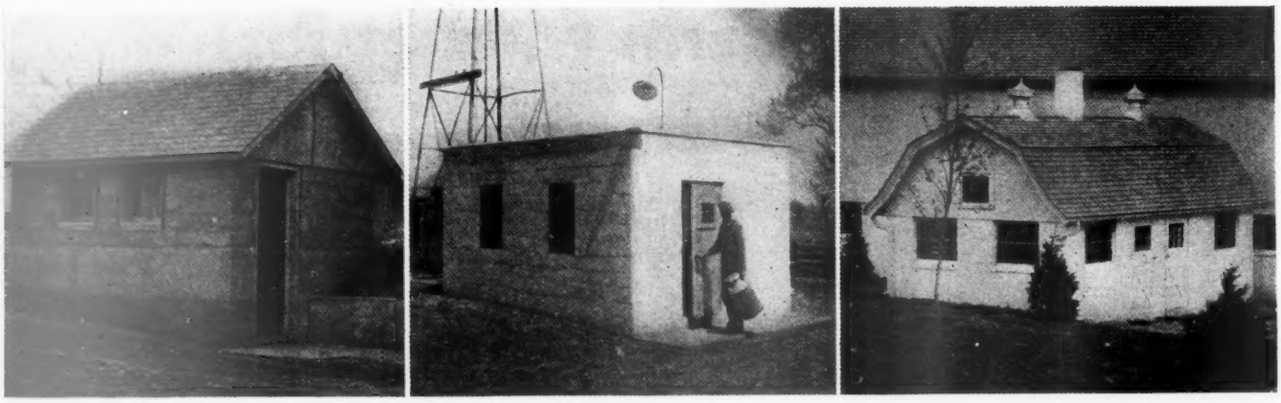
As a second step, the workman grooves the mortar with a rounded tool to emphasize the horizontal joint.

One of the most impressive parts of the farm market portfolio is the series of farm construction booklets for follow-up selling. The booklets are generously illustrated and succeed in answering almost every conceivable question that farmers might raise in connection with concrete masonry construction. One of the most popular and widely circulated booklets in the series opens with a discussion of how to make quality concrete. We have encountered a fair number of products makers who could themselves profit from a careful reading of this portion of the booklet, although it was obviously prepared for the farmer who wishes to do his own construction work. It discusses the building of forms, mixing and placing concrete, finishing and curing, reinforcing, estimating quantities, the common shapes and sizes of concrete masonry units, the patterns that can be produced with masonry units and innumerable other subjects of interest to both builders and owners. By making such information as this available to his farm customers, the products maker not

A closeup of a wall section, showing how the vertical joints are obscured and the horizontal joints emphasized. The wall is finished with two coats of Portland cement paint.

One of the booklets shows by the means of a number of action pictures how a concrete masonry wall is properly constructed. Here (left) the mason "butters" the vertical edges of the blocks with mortar before placing them in the wall. Next (center) the block is shoved firmly against the one previously placed, with special attention to level position. The picture at the right shows two rows of mortar placed on the wall and the correct method of placing the block—the outside top edge level with and touching the chalk line.





The booklet on building sanitary milk houses contains pictures of several types of houses from which dairymen may choose. Center building is completely fireproof, the roof being of precast joist concrete construction.

only creates good will but gains a measure of assurance that uninformed farm builders will not, by following poor construction practice, give concrete masonry a bad name in the community.

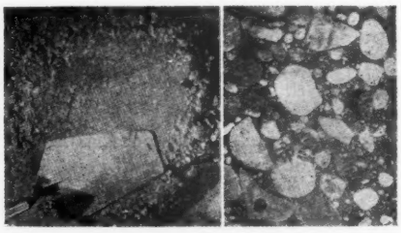
Other booklets in the series discuss farm repairs, the proper housing of various farm animals, dairy farm improvements of concrete, construction details for concrete cold storage locker plants and a wide range of similar subjects. By showing the farmer, as these booklets do, how he can increase his profits by building with permanent, sanitary, rotproof and fireproof concrete masonry, the products maker can assure for himself a steady outlet for his production when competitive conditions return to the building materials market.

The lumber, brick and clay tile industries may logically be expected to do everything in their power to recover the virtual monopoly they once enjoyed in the farm field, and no more serious mistake could possibly be made by the concrete products industry than to suppose that quality or merit alone will determine the outcome. Even when it was first uttered, the bromide about the world's eagerness to buy better mouse traps was probably far from true. In modern business it is an absurdity of the first rank.

The concrete masonry industry is fortunate in having a quality product that can be mass produced at low cost. Today's unprecedented demand for that product should not, however, be misinterpreted by anyone, and least of all by the industry itself. It is not in any sense a tribute to the vast superiority of masonry units over other materials, nor is it a conclusive indication that the general public has entirely abandoned the misgivings with which concrete masonry was once regarded. The product is unquestionably in better repute today than at any time in the history of the industry, but it could be sold on today's market even if it wasn't worth the proverbial tinker's damn.

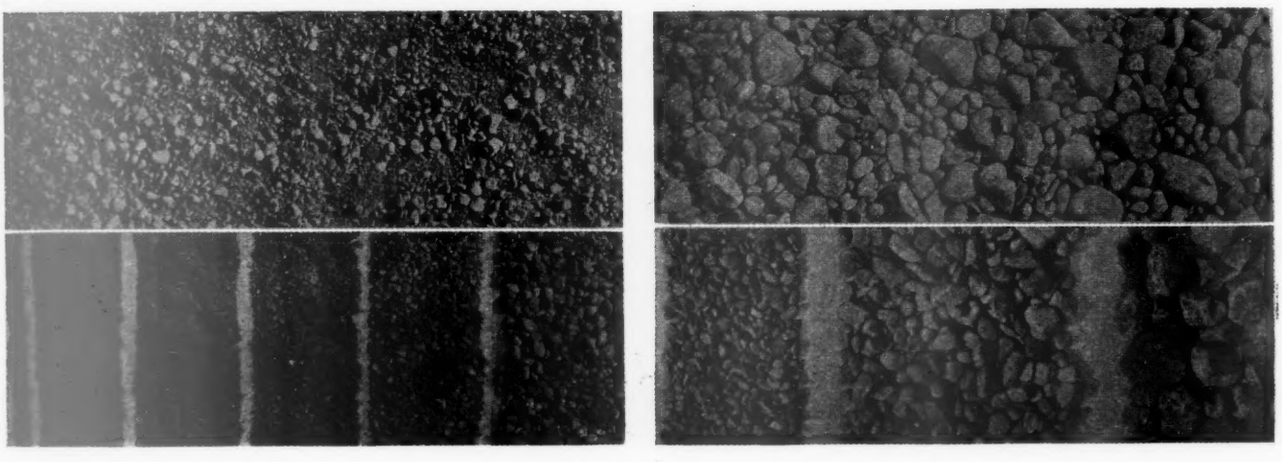
The P.C.A.'s farm market portfolio offers the industry an excellent medium to be used *now* in preparation for the resumption of competitive selling. It offers the concrete products producer an almost infallible means by which he may win the permanent allegiance of the farmers within his shipping area. And, perhaps most important of all, it establishes basic principles of advertising, promotion, intelligent merchandising and customer service that apply with equal force to any of the markets in which concrete masonry must some day compete.

Below, left: Cross section of economical, durable concrete, obtained through use of proper amounts of gravel correctly graded and thoroughly mixed. Right: An example of a good concrete mix for farm jobs. The mix is fairly stiff, yet it has sufficient cement-sand mortar to make smooth, dense surfaces.



Examples of sand and gravel sizes shown in one of the farm construction booklets. Left: Good concrete sand is shown at top. Sizes vary from very fine to small pebbles passing through a 1/4-inch sieve. Sizes needed in a good concrete sand are illustrated by the samples below, which were screened out of the natural mixture of sand above. Right: Good concrete gravel at top. Below are the three sizes combined in the mixture—1/4- to 3/8-in.; 3/8- to 3/4-in.; 3/4- to 1 1/2-in.

Through an arrangement with the Truscon Laboratories of Detroit, a $1,000 fellowship has been granted to the Michigan State College department of civil engineering for the study of certain phases of concrete curing.



California Firm Uses Gas Engines and Rail Transport in Movable Plant

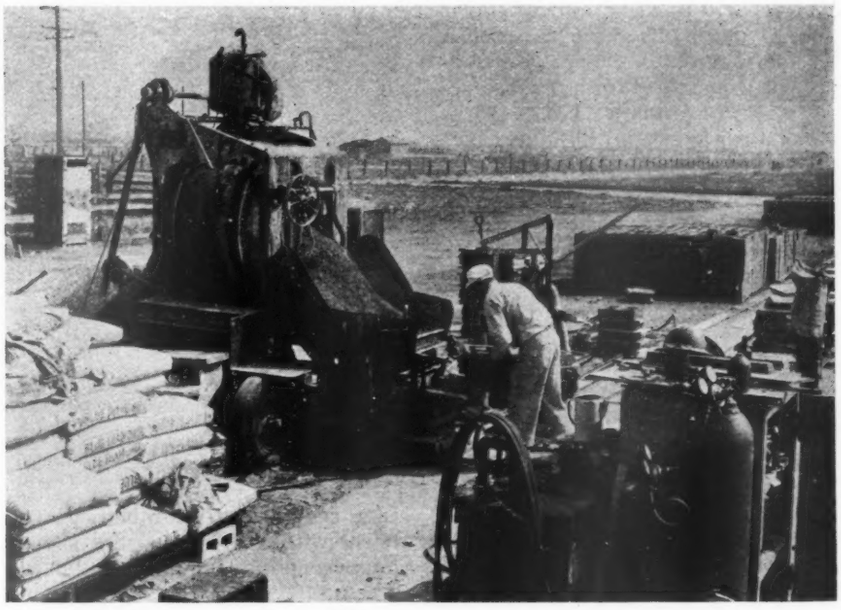
another ON THE SPOT report

THE portable-plant idea is well established in the aggregates and some other industries, but it remained for two Californians to develop a portable concrete-block plant that could be quickly transported from job to job as the occasion demanded.

Dan Pinneo and Geoffrey Clifton, operating as the Acme Block Com-

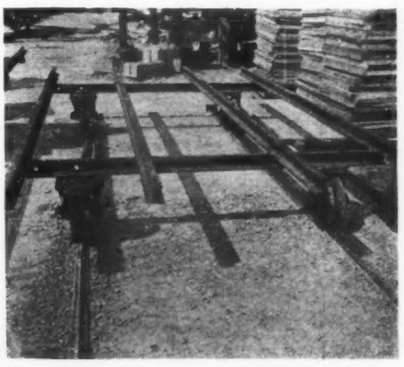
By HARRY F. UTLEY

pany at Hynes, Calif., recently started producing concrete units from a completely self-contained plant powered entirely by gasoline engines. The two men first purchased a Jaeger 10-cubic foot drum-type mixer mounted on 7- by 16-inch pneumatic tires. On the discharge side of this mixing unit, opposite the loading skip, they mounted a Flam No. 1 Challenger vibration block machine and stripping press. The block machine and press are carried on steel cross-beams fastened at right angles to the underframe of the mixer and they can slide under the mixer while the unit is transported over the highways. The mold-box lever, ordinarily operated by hand, has been replaced by a foot control which speeds up the stripping of the units. The mixer is powered by a built-in 20-hp. Hercules gasoline engine, and an air-cooled 1½-hp. Lauson engine vibrates the mold box in place of the conventional electric motor.



A view of the Acme Block Co., Hynes, Calif. yard, showing the portable plant, runway and some of the units in storage.

Block trucks have grooved steel wheels which operate on angle-iron tracks, as shown in the illustration below. These tracks are in sections convenient for taking up, laying and transporting in trucks, along with the pallets, block trucks, etc. On the lot where the plant was first set up, illustrated here, the owners luckily found a strip of narrow concrete paving which made the laying and leveling of the tracks a simple matter.

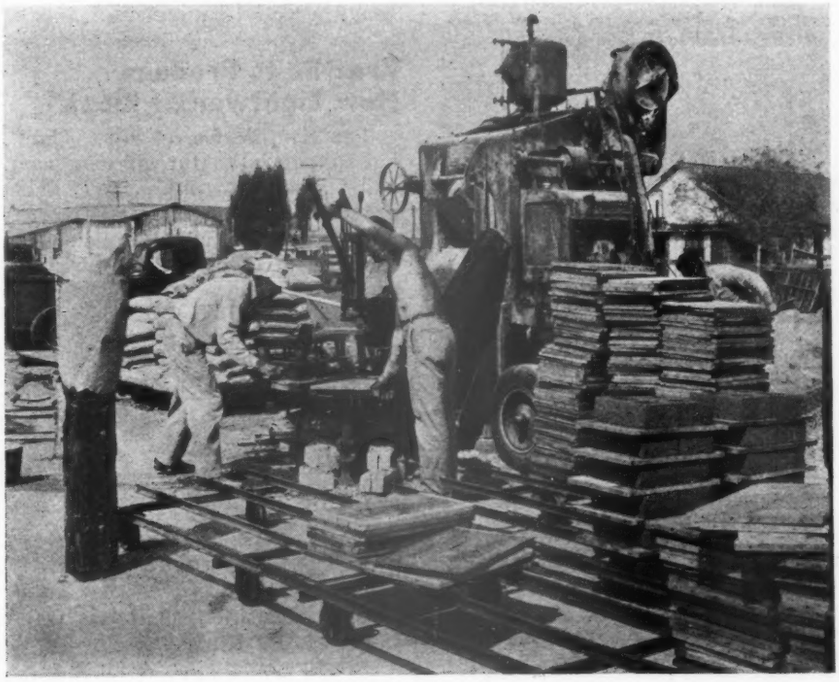


Closeup view of the grooved wheels on the block truck and the angle-iron rails.

The plant was first set up in March of this year at a site on Compton Avenue in Hynes, and production was maintained at an average rate of 1,600 units per day with three men working. A 2-sack

(*Continued on page 134*)

A machine operator swinging a full mold onto the stripping press.



Mobilized Concrete Elevating Unit Solves Vital Construction Problem

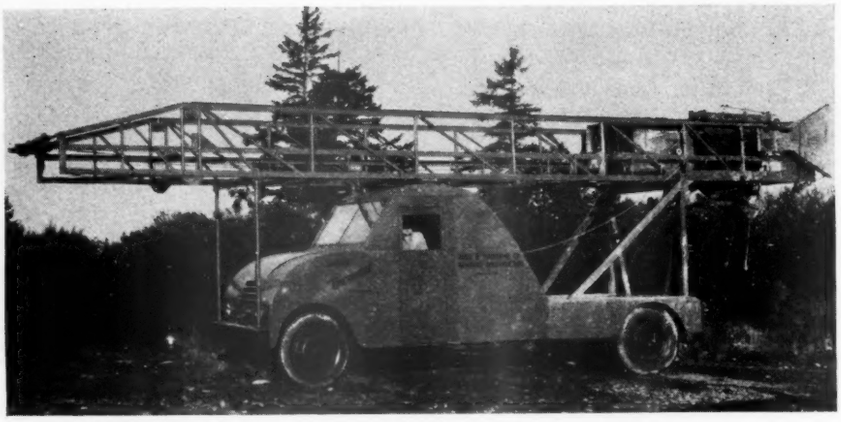
another ON THE SPOT report

TYPICAL of the post-war development and broadened service of the ready-mixed-concrete industry is the recent formation in Los Angeles of the Concrete Elevating Company. This concern carries on where the truck-mixers leave off, elevating

By HARRY F. UTLEY

and distributing the concrete into the forms on construction projects. The concern, in cooperation with the Consolidated Rock Products Company, large-scale producer of ready-mixed concrete, is elevating 2,500 cubic yards of concrete for the W. W. Petley Co., general contractor on the Santa Monica High School job, and approximately 1,500 cubic yards for Contractor C. L. Peck on the new plant building of the Byron Jackson Co., Los Angeles. Four other jobs have already been elevated for the Howard Hastings Co.

The concern utilizes the Towermobile in this work. The Towermobile, a recent development of Mixermobile Manufacturers, Portland, Ore., was created to fill a demand built up by widespread use of the well-known Mixermobile. Unlike the Mixermobile, however, the Towermobile does not mix concrete, but is merely an elevating unit. It is a complete, truck-mounted steel tower with a 1½-cubic-yard storage hopper and a 1-cubic-yard bucket. The unit is extremely mobile, having a road speed of 45 miles per hour. The tower can be erected in about 10 minutes and, with the jacket set, is ready to accept concrete and elevate it. It can likewise be moved into a new position on the job site with comparable speed. All operations are controlled by one man from the truck cab, power being provided by the truck motor through a power take-off unit. The primary tower is 35 feet in height and may be extended even higher by the addition of standard 10-foot tower extensions.

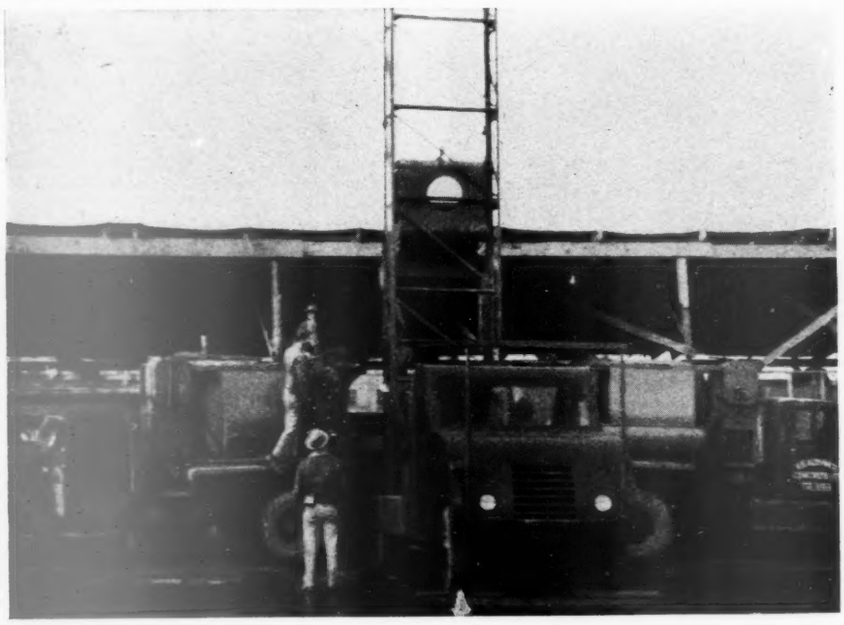


Mobile elevator with tower in position for travel to the job site. This unit constitutes a part of the equipment of the Concrete Elevating Co. of Los Angeles.

The tower and elevating bucket on the Towermobile are so constructed that ready-mixed-concrete trucks can discharge into the bucket from either side. The bucket is low enough to receive concrete from either the horizontal low-discharge type or tilted high-discharge truck-mixtures.

Besides elevating concrete, the unit may be used to elevate other materials, such as bricks, blocks, and hardware by simply interchanging the concrete bucket with a 6- by 6-foot platform. An A-frame attached to the upper header tower can also handle a cable for raising heavy pieces of equipment.

The tower erected on the job, with two truck-mixers, one on either side, in position to discharge concrete into the bucket. Only the lower part of the steel tower is visible in this view.



Kraftile to Produce New Lightweight Block

The Kraftile Co. of Niles, Calif., has announced that it will soon begin making a new product, a light-weight concrete block called "Kraflite". The new units are described as inexpensive, fireproof and termite-proof. They will be made of batched aggregates and light-weight pumicite.

James Crawford, vice-president of Kraftile, will be in charge of Kraflite production and distribution for the San Francisco area.

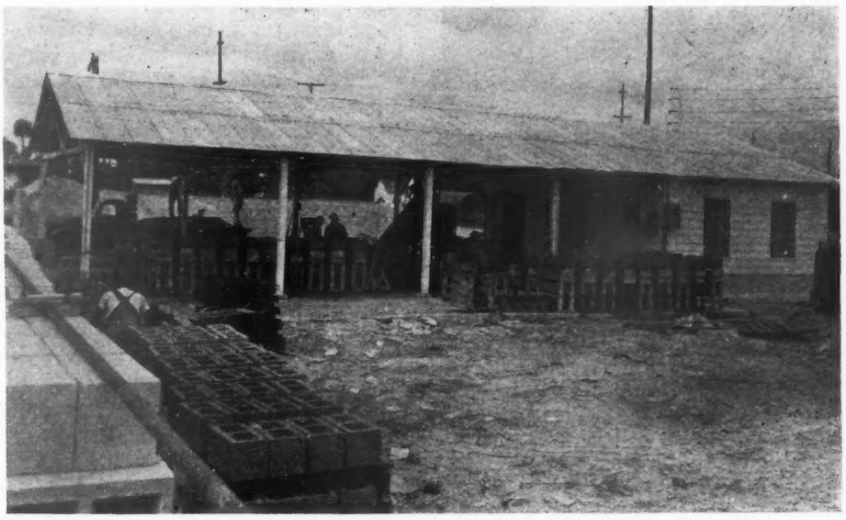
What do you want to know about the ready-mixed concrete industry or about concrete blocks, pipes, etc.? The Concrete Industries Yearbook can probably tell you.

New Florida Products Concern Uses Block Machine With Vibrating Cores

another ON THE SPOT report

BUILDERS, INC., of Holly Hill, Florida, has the first installation (outside of Allen Kissam's own plants in Orlando, Florida) of the Kissam - Blatt controlled - oscillation block machine. The firm began operating in March of this year with a single machine, but a few weeks ago production was doubled by the delivery of a second unit. Ultimately six Kissam-Blatt machines will be operated—two for the production of 8- by 8- by 16-inch units and four in the production of the 4- by 8- by 12-inch units which are growing rapidly in popularity throughout Florida.

By WILLIAM M. AVERY



A general view of the new plant of Builders, Inc., Holly Hill, Fla.

With coarse aggregates at present constituting a serious bottleneck in the Florida building material industries, this concern is using either ⅜-inch granite chips from South Carolina, or slag from Birmingham, both shipped in by rail. Washed lake sand, shipped from Interlachen, Florida, is used in current operations at the rate of a carload every three days. The materials are unloaded by dragline into ground-level open storage bins adjacent to the plant siding. Two or three carloads of material are kept in storage.

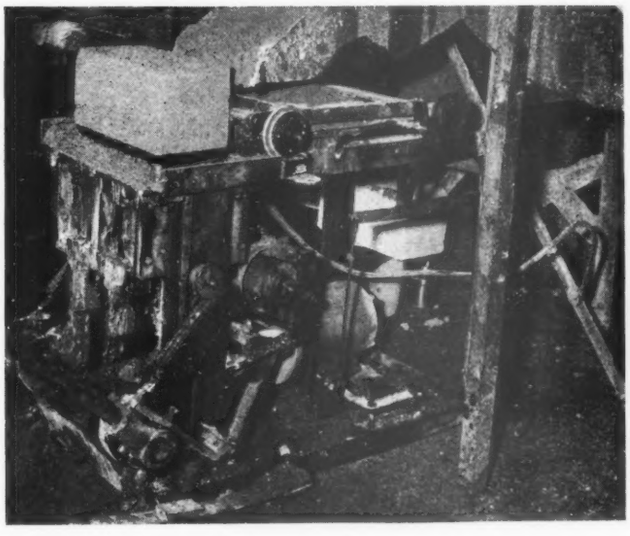
The materials are wheeled to a 10-cubic-foot Blatt mixer in the proportions of 3 parts slag to 3½ sand to 1 bag of cement. The slag is mixed with water before the cement addition is made. The mixer discharges on a 12-inch inclined belt conveyor which feeds a hopper box above the block machines.

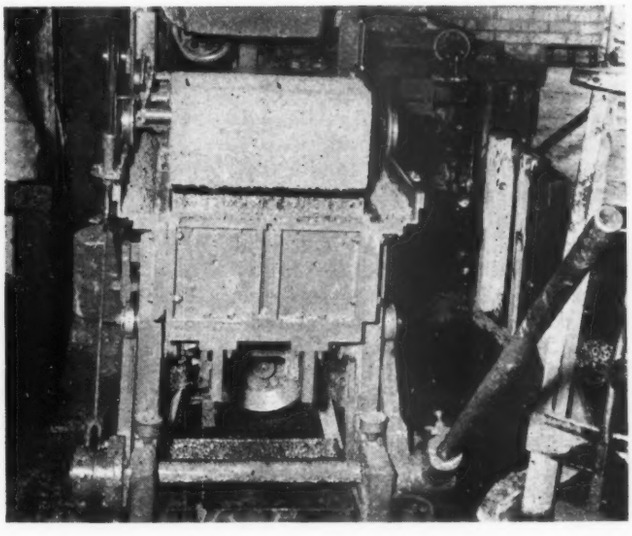
With an operator and a helper on each machine, production per machine per 8-hour day averages 1,300 8- by 8- by 16-inch equivalents. Without the helper, output drops to about 1,000 units per machine.

The controlled oscillation of the cores alone in the Kissam-Blatt machine makes it possible to use a wetter mix than is customary in concrete making. This is said to result in unusually dense, highly waterproof blocks with yields as high as 27 units per bag of cement. Because of the high tempo of the oscillations, it is unnecessary to anchor the machine, and no provision is made for lagging. As a result it is a simple matter to move the machines when cleaning up around them.

In operation the machine makes only a low humming sound. This is perhaps its most striking characteristic, contrasting as it does with the unholy din that generally pervades block plants. Other things being equal, it seems probable that operators might maintain high production for longer periods in a relatively quiet plant, although so far as we are aware, no studies of this problem have been made in relationship to block operations. The core vibration in the Kissam-Blatt machine is stopped instantly by means of a solenoid brake when the carriage is moved back.

The controlled-oscillation block machine produces a single 2-core unit weighing about 33 pounds.





Most of the block machines produced in Florida, including the Kissam-Blatt machine, produce a 2-core

Materials are mixed in a 1-bag mixer and conveyed to a hopper box above the block machines.

unit weighing approximately 33 pounds, as compared with about 44 pounds for 3-core units. In addition to the reduction in weight, the 2-core unit is somewhat easier to handle in laying, since it balances perfectly when picked up by the center web. The larger cores are also said to have

A view in the yard, showing how blocks are stacked to facilitate air drying.

some advantage when it is necessary to run conduit and piping in the wall.

Builders, Inc., use 12-unit wood racks, handling them with a Yale & Towne jack-lift truck from the machine, and with a Truck Man gasoline lift truck on the yard. Although the blocks are removed from the pallets each morning, no trouble has been encountered so far with breakage. The present paved storage area is about 12,000 square feet, and there is additional land for future extensions. The units are kept wet for 5 days, and air dried for an additional 5 days before being shipped. The units test at about 1,250 pounds per square inch in 10 days, and are said to be about 95 per cent. waterproof.

When the additional block machines are delivered the company plans to build a 50-foot extension of the present 20- by 30-foot building. An additional mixer and conveyor will also be required. The machines will be set up in groups of three.

Sales are for the most part going into local housing in Holly Hill and nearby Daytona Beach. The company operates its own 6-ton Chevrolet truck for making deliveries. Nine men are employed in the present 2-machine operation. Rudy N. Graham is president of Builders, Inc., J. V. Roberts is treasurer, and M. B. Conklin, secretary.

Western Shale Products Now Making Ready-Mix

At Fort Scott, Kan., the management of the Western Shale Products Co. has recently announced the addition of ready-mixed concrete to its line and the doubling of its concrete block output. The new equipment includes two 50-ton bins with bucket elevators and a seven-sack mixer. Harley Brown, president and general manager, stated that the ready-mix plant is the first in southeastern Kansas. The company, formerly in the brick business, converted its facilities to block making in 1945.

California Firm

(*from page 131*)

mix consisting of one part cement, four parts sand, and three parts pea gravel yields 40 units of the 4- by 8- by 12-inch size in an 8-hour day, or an equivalent in smaller sizes.

Mr. Pinneo, a handy man with a

Geoffrey Clifton (left) and Dan Pinneo (right) pose before the vibrating table.

welding torch, fabricated all the necessary equipment to assemble the plant including the block trucks and rail sections.

Kuehne Develops Four Special Dry Ready-Mixes

A formula for a dry ready-mix concrete for repair work has been developed by Otto Kuehne, Jr., manager of the Kansas Sand Co. of Topeka, Kan. With the addition of water to "Tru-Mix", it is ready for application. Four mixes, adapted to various uses, are produced: one for strong concrete in practical outdoor applications such as repairing curbs, posts and machine bases; a special sand mix to be used as a plaster coat for plastering or pointing up old stone walls; "Water-tite" mix for basement walls and concrete tanks or pools; and a mortar mix for laying brick, concrete blocks, etc.

The sand and gravel used in "Tru-Mix" dry products are dried in a rotary kiln at a temperature of 2,000 degrees F. It is claimed that approximately 100 per cent. of the moisture is removed in the drying

A carload of Tru-Mix ready to leave Topeka.

process. The tendency to harden or deteriorate is thus almost negligible, unless the mix is exposed to moisture. This feature permits the saving of left-over Tru-Mix from one job to the next.

These products are put up in 25-, 50-, and 100-pound water-proof bags, and may be satisfactorily stored for months if kept in a dry place. Favorable results have been obtained from 2 years of experimental tests.

F.H.A. Appraisal System To Protect Home Buyers

Prospective home buyers can obtain a substantial measure of protection against the dangers of inflation by using the F.H.A.'s appraisal system at a cost of $10, Commissioner Raymond M. Foley of the Federal Housing Administration, has announced.

F.H.A. rules have been amended to enable anyone proposing to buy or build a home to ascertain on payment of a fee of $10 the F.H.A. valuation on the property before making a commitment to purchase.

Ill. Brick Co. Builds Plant For Making Waylite Units

John Goodridge, president of the Illinois Brick Co. of Chicago, has announced that construction is under way on a $300,000 plant for the manufacture of a new type of concrete block, which will have an annual capacity estimated at 10,000,000 blocks.

The units will be made of "Waylite", an aggregate made from steel mill slag, and will weigh only 28 pounds, as compared to 45 pounds for a block of the same dimensions using sand and gravel. Mr. Goodridge stated that the new blocks have been produced for the last year at a suburban plant purchased from the Chicago Insulcrete Co.

Natchitoches to Have $75,000 Block Plant

The $75,000 plant of the Acme Cement Products Co., of Natchitoches, La., now under construction, is rapidly nearing completion. The plant will have a daily capacity of 4,800 8- by 8- by 16-inch cored blocks.

All products will be regularly certified by an underwriters laboratory, and will meet all the specifications of the various building codes. In addition to making blocks and precast building material, the firm will deal in ready-mixed concrete.

workability

durability

and controlled air

with DAREX AEA

Improved workability with Darex AEA will save money. Improved workability makes concrete easier to place and permits quicker finishing. Darex AEA improves the durability of the hardened concrete with little or no loss in strength. With Darex AEA you have complete control of the air content, regardless of the nature of the aggregate used, the richness of the mix, or the length of time of the mix. Darex AEA is not supersensitive. It is safe. It comes ready to use. It is inexpensive.

simple proportioning equipment available

To facilitate use of Darex AEA, simple devices for proportioning have been designed. Blueprints are available, or we can supply you with the proportioners. Use Darex AEA and get workability, durability, and controlled air entrainment. *Write for booklets.*

p.s.

to concrete block manufacturers:

You get *special* advantages from using Darex AEA. Darex AEA will increase production—minimizes green breakage and culls. Darex AEA gives you increased strength, better appearance, better finish, lower moisture absorption. *Write for details.*

DEWEY AND ALMY CHEMICAL COMPANY

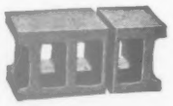
CAMBRIDGE 40, MASSACHUSETTS

FASTER CUTTING ...with Clipper Masonry Saws

Your Special Size and Shape Brick or Concrete Block can now be "Tailor-Made" at a moment's notice!

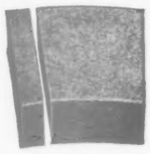
The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which concrete products and fire brick can be cut.



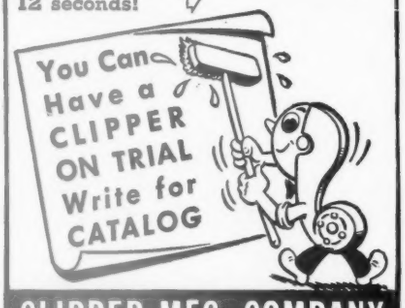
This concrete block, converted into a special size, was cut completely in two in 19 seconds.

One of the many intricate cuts performed on first quality clay brick for heat treating furnaces —made in 8 sec.



Rotary Kiln Blocks, cut to size for "key" bricks in rotary kilns, require only 10 sec. for completion of cut.

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!



CLIPPER MFG. COMPANY
4038 Chouteau St. Louis 10, Mo.

Sand Lime Brick Makers Win Price Ceiling Increase

According to *Housing Bulletin No. 25*, issued by the Office of Price Administration, manufacturers of sand lime building brick have been authorized to add $2 to their March, 1942, ceilings, effective April 6. The action does not affect manufacturers who already have had individual increases of $2 or more per 1,000 bricks; it authorizes resellers to pass on the resulting actual dollar-and-cent amount. The increase was granted to eliminate any possible price impediment in the production of sand lime brick materials needed in the post-war home building program.

The bulletin also announced the appointment of David N. Edwards as price executive of the rapidly expanding building materials branch of the Building and Construction Price Division, to succeed W. S. Ingram.

Concrete Block Producer Retires After 35 Years

Frank C. Burritt, who has been associated with the Rockford Cement Products Co. of Rockford, Ill., for the last 35 years, has announced that he will retire from business. He has sold his interest in the firm, which manufactures concrete blocks, to his partner, H. W. Beale. Robert M. Beale, son of Mr. Beale, who recently returned from service in the Army Air Transport Command at Hickam Field, Honolulu, will be associated with his father.

Factory Additions Will Double Besser Output

Officials of the Besser Manufacturing Company of Alpena, Mich., have announced that production of concrete block machinery at their plant would be doubled with the completion of two additions now under construction. To the east is a craneway which will be connected with the original structure by another unit. West of the present plant a supply storage house is being erected. These additions comprise the fourth such expansion at Besser within the last ten years. It is anticipated that the payroll will increase from 450 to at least 500.

Stephen Flam, manufacturer of the Flam Challenger line of vibration block tile machines, is continuing the expansion program at his plant and machine shop at Van Nuys, Calif. One addition to the plant was erected during 1945, and a second building is now under construction.

DO YOU OPERATE AN $18,000 BUCKET?

If you operate an $18,000 crane *on bucket work*, you most certainly operate an $18,000 bucket, for your entire crane investment during that period depends upon the efficiency of the bucket. We know a contractor who operated a used ½ yd. bucket when an analysis of the job and crane called for a ¾ yd. bucket. *In ordinary excavating work he lost 10 cu. ft. of pay load on every bucket cycle.* Do a little figuring or better yet, wire us collect the capacity of your crane, the boom length, and the material handled. We'll give you facts that will mean more profits on bucket work—help you get the most out of your crane investment on bucket work.

ERIE STEEL CONSTRUCTION CO.

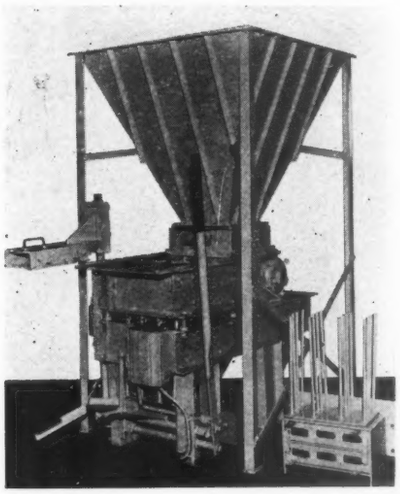
666 GEIST RD., ERIE, PA.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

NEW MACHINERY and SUPPLIES

● Block Machine

A new concrete block machine and steel hopper has been announced by Fabricating & Machinery, Inc., of Birmingham, Ala. The standard machine is



Also produces corner blocks.

equipped with core boxes for producing 8- by 8- by 16, 8- by 8- by 8, and 4- by 8- by 16-inch, partition blocks. By removing the end half-core in the mold box, corner blocks can be made; with the half-core in place, wall blocks will be formed. When the vibration in the core box is stopped, a mechanical brake is applied automatically, to shorten the operation cycle.

● Estimating Tables

A loose-leaf book of estimating tables, covering practically every known and commonly-used type of masonry and frame construction, is now available for lumber and building supply dealers. Compiled by Albert F. Schaefer, vice-president of the Schaefer Bros. Builders Supply Company, Inc., of Rochester, N. Y., these tables are claimed to save time and expense and to eliminate errors in making estimates of the quantity of materials required and total cost for specific construction jobs. The subjects are arranged and indexed to assure quick, easy location of desired data. The loose-leaf feature permits the addition of pages covering new materials and methods.

● Products Machine

The F. C. George Machine Co. of Orlando, Fla., has recently introduced its "George Super V" concrete block machine equipped with accessories to provide for open-end or square-end blocks, jamb blocks, lintel blocks, half blocks,

Versatile block machine.

and masonry units of various sizes and shapes. Models are available for either 2- or 3-cell block production. The cores are individually mounted on U-shaped flexible steel supports which combine with mounted floating units to attain a reported high degree of vibrating action. Special insulators for the mold box are said to concentrate the vibrations in the mold assembly. The high frequency vibration is directed in diverse directions at the time when the block is being formed, a feature claimed to minimize fatigue in the block machine frame.

The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Hobbs block machines, Anchor tampers, Anchor, Jr. strippers, Stearns power strippers and Jolterete, Stearns mixers and pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Universal Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager Columbus, Ohio

"IT JUST KEEPS ROLLIN' ALONG"

KENT CONTINUOUS MIXER

KENT Two Hopper No. 2½ Mixer. Capacity, 8 cubic yards per hour.

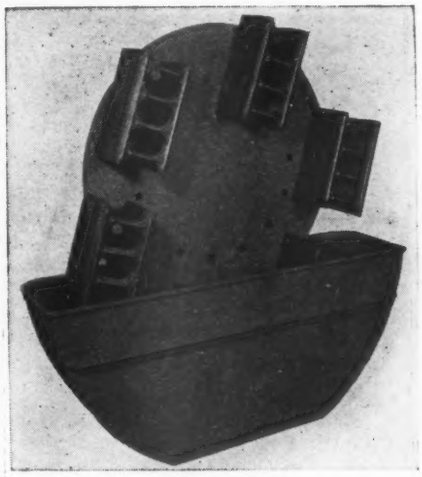
A STEADY STREAM OF PERFECTLY PROCESSED CONCRETE— insured by this KENT machine—is just what your block plant needs to establish output and profit records.

KENT accuracy in measuring cement and aggregates — KENT thoroughness of mixing — KENT simplicity and durability — KENT operating economy—enable concrete block producers everywhere to handle current orders and "get set" for bigger post-war business.

For Clean Pallets . . .

dip 'em in the

KENT DUNKER

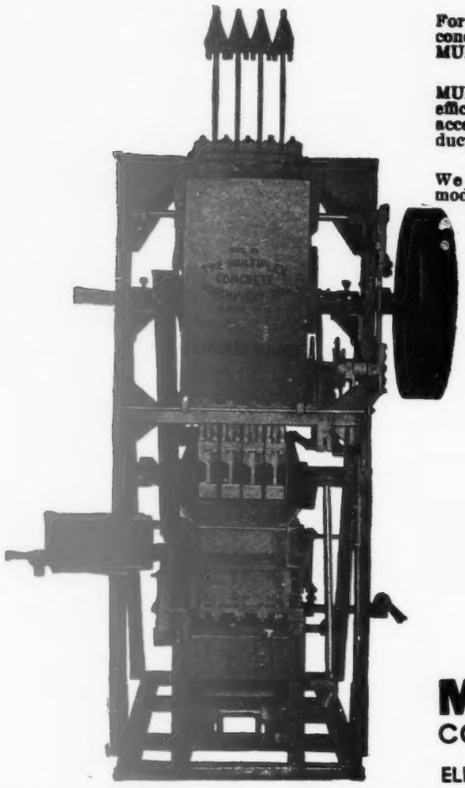


Your pallets will mold better blocks and give longer service if they are regularly cleaned and oiled in a KENT Dunker. Hang 'em on the pins—as you take them off, the rest are rotated through the tank. Truck crank case oil works perfectly.

Write for Bulletin

The KENT MACHINE CO.
Cuyahoga Falls, Ohio

MULTIPLEX Machines For Postwar Profits



For a Quick "Take-Off" and sustained pace in concrete block output, reserve one of the MULTIPLEX *high-speed* machines.

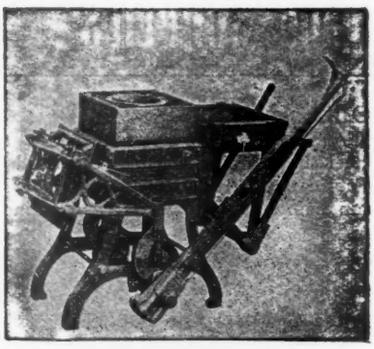
MULTIPLEX offers a wide variety of super-efficient mixing equipment, with all types of accessories necessary for economical mass production.

We can recommend MULTIPLEX units for modernizing *your* plant and enlarging its capacity.

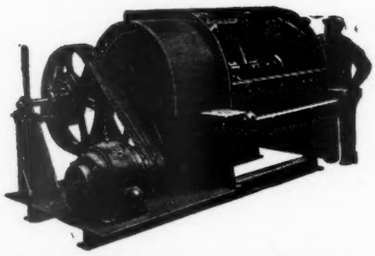
Our universal type MULTIPLEX Standard Tamper for making plain and stripper, or face blocks, on one base. Easily convertible as business expands. Supplied with 4-bar or 8-bar tamper, either power or hand operated.

Write for Booklet describing the MULTIPLEX complete line of concrete mixing equipment, including Double and Single Hand Press Strippers, Power Press Strippers, and Super-Tampers.

MULTIPLEX
CONCRETE MACHINERY CO.
Frank Muenzer, President
ELMORE • OHIO



The MULTIPLEX Flue Block Machine makes ventilated, solid or lightweight units, including all attachments for ventilator and stove pipe openings.



MULTIPLEX Multi-Mixer with reverse screw-type action insures fast and thorough mixing of every batch. Side, end or bottom discharge.

FOR SALE

Concrete Block Plant.

Complete—Besser equipped.

Only plant in city of 60,000 population.

For further details write

Box No. 63, c/o Pit & Quarry Publications
538 So. Clark St. Chicago 5, Ill.

CINDER CRUSHERS

10 to 20 tons per hour capacity $345
25 to 50 tons per hour capacity 795
Vibrating screens 495

Guaranteed

Immediate delivery—Write, phone, or wire. Phones Garfield 5712. Evenings UN2832.

BONDED SCALE COMPANY
1100 Bellview Columbus 7, Ohio

PALLETS

For sale, 2,000 plain steel pallets
¼ x 12½ x 18½"
POTTER COAL & MATERIAL COMPANY
Indianapolis 1, Ind.

ESTIMATE ANY CONSTRUCTION JOB *RIGHT* WITHOUT FIGURING

SCHAEFER'S NEW 1946 ESTIMATING TABLES contain 225 pages of tables, charts and illustrations covering all types of brick, tile, cinder block, stucco, concrete, cement, plaster and lumber construction. They cut estimating time to a fraction, prevent costly mistakes, soon save their cost many times over. Durable loose-leaf binder. Send for descriptive folder *today!*

SCHAEFER'S ESTIMATING TABLES
229 RAVENWOOD AVE., ROCHESTER 11, N.Y.

POSITION WANTED

By Concrete Products man. With 12 years in concrete pipe and building block fields. High School and 2 years mechanical school education. Best of references, now employed.

Box No. 51
c/o Pit and Quarry Publications
538 So. Clark St. Chicago 5, Ill.

FOR SALE

2—Concrete Block Plants. Both going concerns. Each plant now producing 1500 blocks daily. Located in good community and both with more business than they can handle.

CORBIN CONCRETE BLOCK COMPANY
Corbin, Kentucky

FOR SALE

Concrete Products Plant manufacturing concrete pipe, drain pipe, building blocks and roofing tile. Write for full information.

J. R. MONTIGEL
Route No. 2 Box 12
Riverside, California

WANTED TO BUY

2 and 3 cubic yard Transit Mixer, unmounted or mounted. Must be in good condition.

Ready Mixed Concrete, Inc.
Second St. at Penna. RR.
Mansfield, Ohio

WANTED TO PURCHASE

Used Stearns Joltcrete Concrete Block Machine or Besser Vibrapac Machine.

Box 67, c/o Pit & Quarry Publications
538 South Clark Street, Chicago 5, Ill.

WANTED

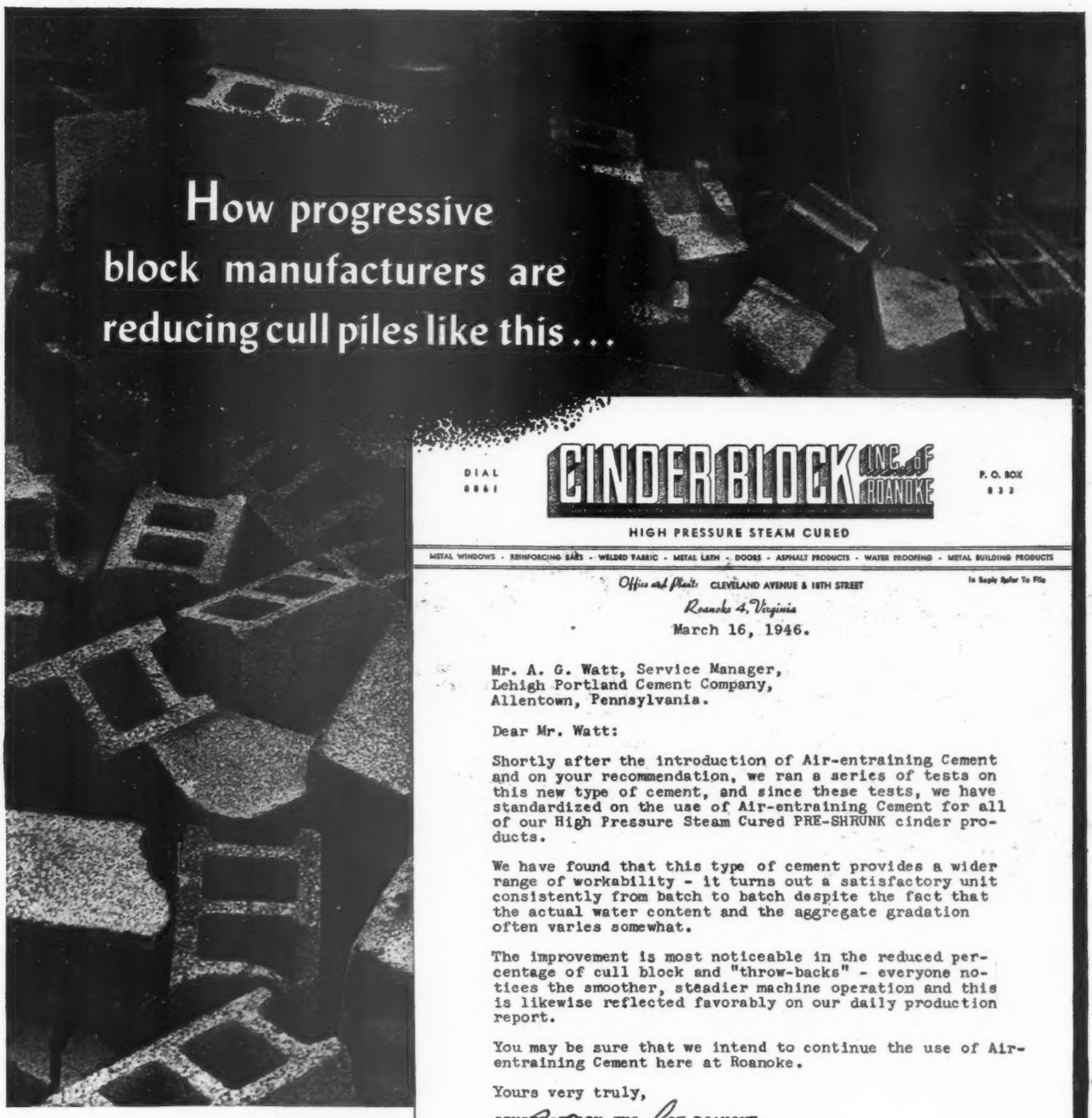
10 S Jaeger Tilt Type Mixers.

AMERICAN WILBERT VAULT CORPORATION
Forest Park Illinois

WANTED

Complete cinder block manufacturing plant; please list equipment, make, condition and price.

Reply to P. O. Box 185, Elmwood Sta. Providence 7, R. I.



DIAL 8861

CINDER BLOCK INC. OF ROANOKE

P. O. BOX 833

HIGH PRESSURE STEAM CURED

METAL WINDOWS · REINFORCING BARS · WELDED FABRIC · METAL LATH · DOORS · ASPHALT PRODUCTS · WATER PROOFING · METAL BUILDING PRODUCTS

Office and Plant: CLEVELAND AVENUE & 18TH STREET

In Reply Refer To File

Roanoke 4, Virginia

March 16, 1946.

Mr. A. G. Watt, Service Manager,
Lehigh Portland Cement Company,
Allentown, Pennsylvania.

Dear Mr. Watt:

Shortly after the introduction of Air-entraining Cement and on your recommendation, we ran a series of tests on this new type of cement, and since these tests, we have standardized on the use of Air-entraining Cement for all of our High Pressure Steam Cured PRE-SHRUNK cinder products.

We have found that this type of cement provides a wider range of workability - it turns out a satisfactory unit consistently from batch to batch despite the fact that the actual water content and the aggregate gradation often varies somewhat.

The improvement is most noticeable in the reduced percentage of cull block and "throw-backs" - everyone notices the smoother, steadier machine operation and this is likewise reflected favorably on our daily production report.

You may be sure that we intend to continue the use of Air-entraining Cement here at Roanoke.

Yours very truly,

CINDER BLOCK INC., OF ROANOKE

President

MWF:mw

PRE-SHRUNK

Leading block manufacturers are cutting down costly culls and throwbacks, and turning out strong, better-looking products . . . by using Lehigh Air-Entraining Cement.

It will pay you to make tests of Lehigh Air-Entraining Cement, using your own aggregates, and compare the results with those you are now obtaining. And don't hesitate to consult our Service Department . . . we'll be glad to help on any specific problems.

Lehigh CEMENTS

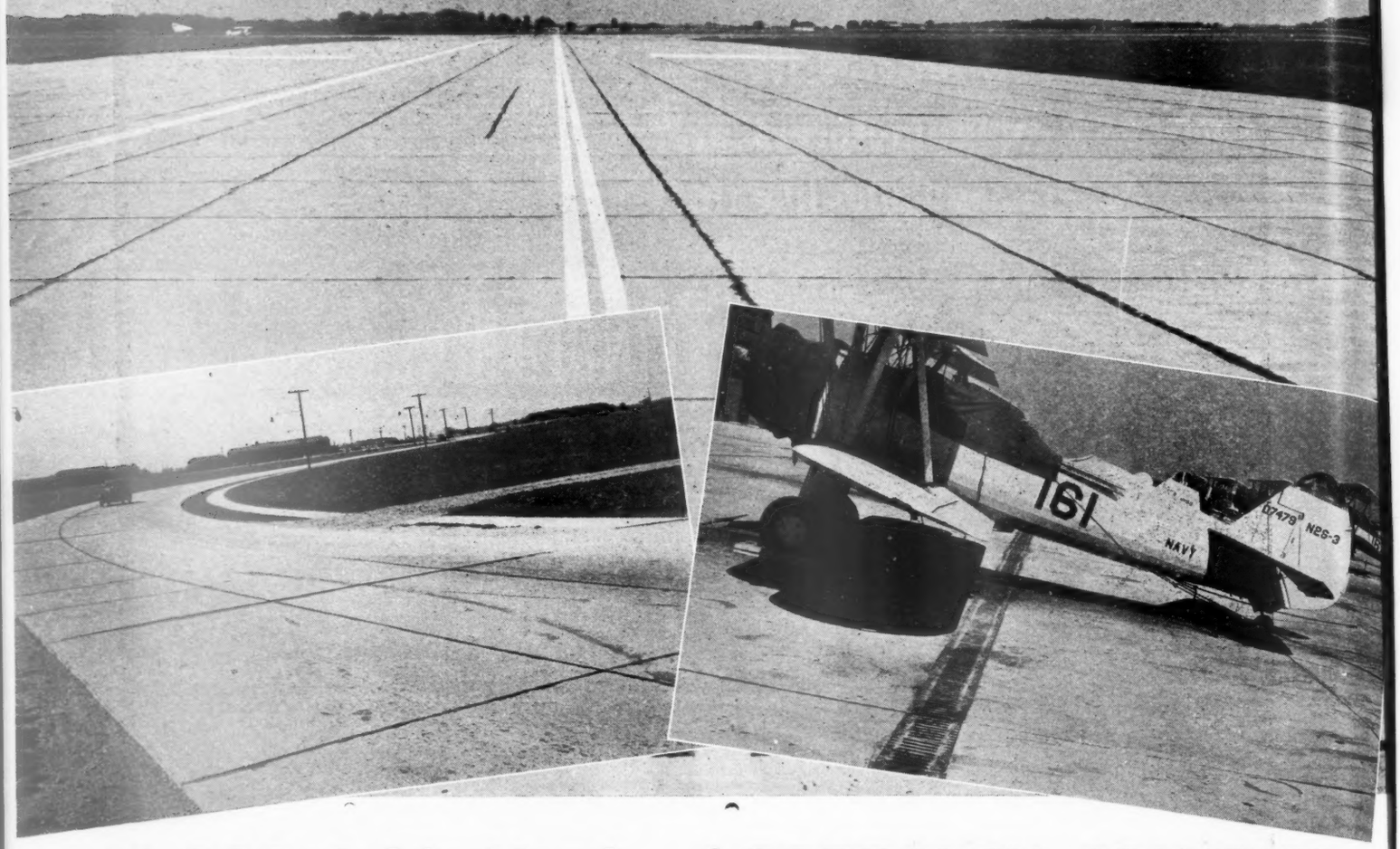
Write for the booklet "Lehigh Air-Entraining Cement . . . What it is . . . What it does . . . How it should be used."

LEHIGH PORTLAND CEMENT COMPANY
ALLENTOWN, PA. · CHICAGO, ILL. · SPOKANE, WASH.

LEHIGH MORTAR CEMENT · LEHIGH NORMAL CEMENT · LEHIGH AIR-ENTRAINING CEMENT · LEHIGH EARLY STRENGTH CEMENT

"THREE SEVERE WINTERS *plus* DE-ICING TREATMENTS LEFT NO MARKED EFFECT..." *

*Engineering News Record — Feb. 21, 1946 Pgs. 80-81
"Durability of Concrete at an Airfield."



240,000 Cubic Yards of POZZOLITH CONCRETE In U. S. Navy Bunker Hill Air Station

"Alternate freezing and thawing during the past three winters has caused no noticeable deterioration . . . nor has the application of calcium and sodium chlorides which were used extensively on portions of the pavement.

"Credit for this durability . . . is attributed to the use of a cement dispersing agent . . ." (Pozzolith). Cement dispersion also served importantly as a lubricating agent to provide a properly lubricated, plastic mix.

Pozzolith produces all the benefits of air entrainment and does so with increased strength and at lower cost. Findings of the Nation's top testing authority prove this. Pozzolith's high standard of performance has won it wide acceptance as use in millions of cubic yards of concrete testify.

May we have one of our field representatives call, by appointment, to provide you with further information on the benefits of Pozzolith, cement dispersion?

THE MASTER BUILDERS COMPANY

CLEVELAND 3, OHIO • TORONTO, ONTARIO

MASTER BUILDERS

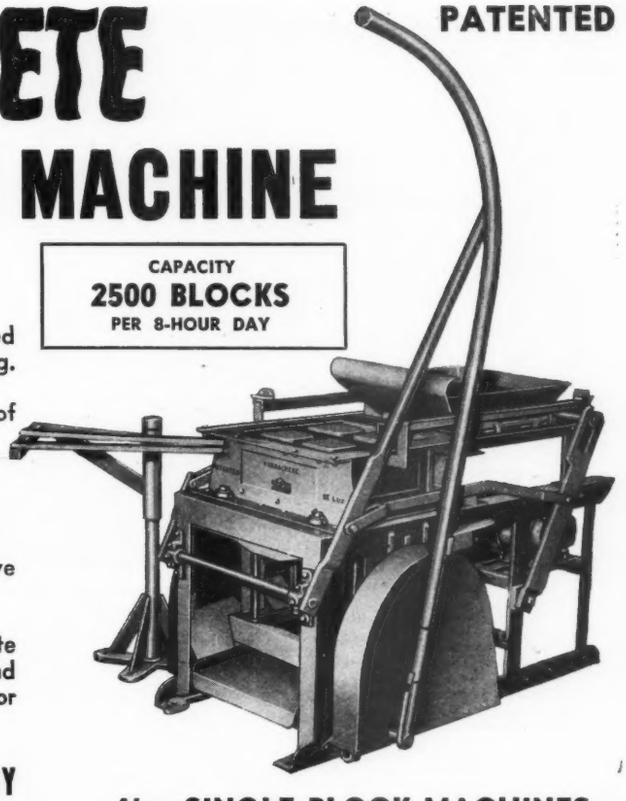
VIBRA-CRETE

LOW COST BLOCK MACHINE

PATENTED

***There is None Like* VITA-CRETE!**

CAPACITY
2500 BLOCKS
PER 8-HOUR DAY



VIBRA-CRETE has CIRCULAR CORE MOTION, patented as a process, to assure perfection on concrete block making.

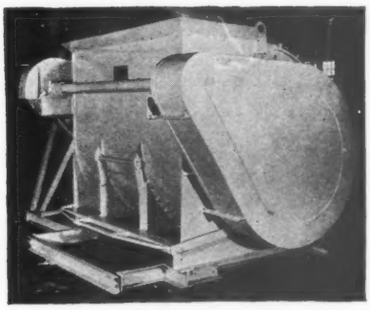
VIBRA-CRETE packs to the utmost degree every part of the block during molding process—ends, sides, center, top and bottom. Perfection machining and engineering give equal top and bottom core movement within a stationary, solidly anchored mold box. A specially devised block ejecting mechanism guarantees free, easy movement. Reversible core box walls work to give longer life to your machine.

VIBRA-CRETE machines are made to meet your concrete block specifications. EARLIEST DELIVERY is a prime and important feature of VIBRA-CRETE machines. Write or wire.

ALLIED WELDING **& MANUFACTURING COMPANY**
49 Lorna Doone Boulevard
ORLANDO, FLORIDA

***Also* SINGLE BLOCK MACHINES**
1000 Blocks per 8-Hour Day

Answers YOUR Need!



This powerful, heavy-duty CONCRETE MIXER is equipped with two spiral blades, hardened liners and precision roller bearings . . . capable of meeting every production requirement in the efficient operation of your Block Plant.

SHIPMENTS ORDINARILY MADE IN 2 WEEKS
after receipt of order

POWER EQUIPMENT CONSTRUCTION CO.
PAYNE TERMINAL, P. O. Box 472, SARASOTA, FLORIDA

See the NEW MATERIAL HANDLING METHOD.. *at work in companies like yours*

This up-to-the-minute news-picture magazine shows how wide-awake management in many lines of business is utilizing palletized unit loads and fork trucks . . . to end the burden of costly manual methods and speed production.

GOOD NEWS FOR HIGHWAY SHIPPERS

Mechanized handling made available to highway shippers by the new Clark Trucloader Method.

Clark builds **GAS AND ELECTRIC POWERED FORK TRUCKS AND INDUSTRIAL TRACTORS**

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☐ HAVE YOUR NEAREST FIELD ENGINEER CALL.
☐ SEND ME COPY OF MATERIAL HANDLING NEWS.
Name_____
Company_____
City_____ State_____

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CLARK TRUCTRACTOR
Division of CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN
OTHER PLANTS: BUCHANAN, JACKSON, BERRIEN SPRINGS, MICHIGAN

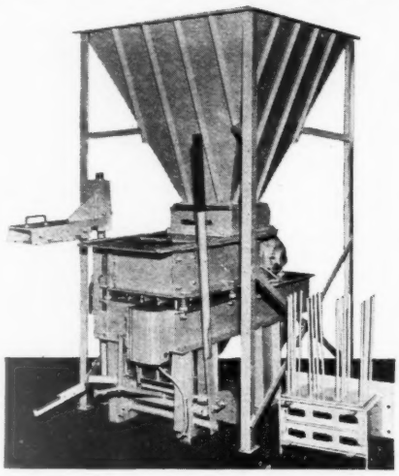
3 Sizes in **CONCRETE BLOCKS** made on the **F & M** MACHINE

8"x8"x16"
Moulded one at a time.

8"x8"x8"

4"x8"x16"

Above two sizes are moulded two at a time.



F&M Concrete Block Machine with steel hopper.

Besides standard concrete blocks, the F&M Machine also moulds corner blocks and partition blocks.

This versatile unit is ruggedly built for continuous, economical service. Moving parts are ball-bearing equipped. Automatic mechanical brake shortens operating cycle. Capacity up to 1200 blocks per 8-hour day. We also manufacture profit-producing mixers and elevators. Write for Information.

FABRICATING AND MACHINERY, INC.
3226 5th Ave. South, Birmingham 5, Alabama Phone 7-8549

Orders Now Accepted for FLAM "CHALLENGER" BLOCK MACHINES for Delivery Anywhere in the United States or Foreign Countries.

●

Tested and proved for 30 years on the West Coast, this well-known, low-cost equipment equals the performance of expensive, complicated machines. Place your order NOW. Write for prices and descriptive literature.

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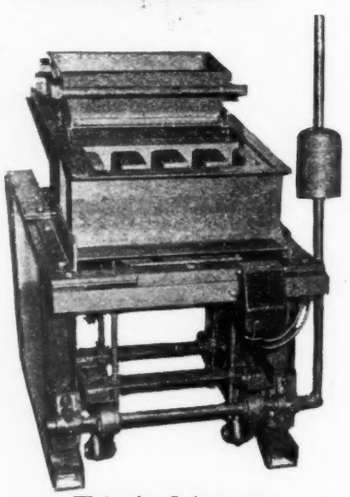
Machine and pallets shipped within two weeks of receipt of order. 20% deposit required.



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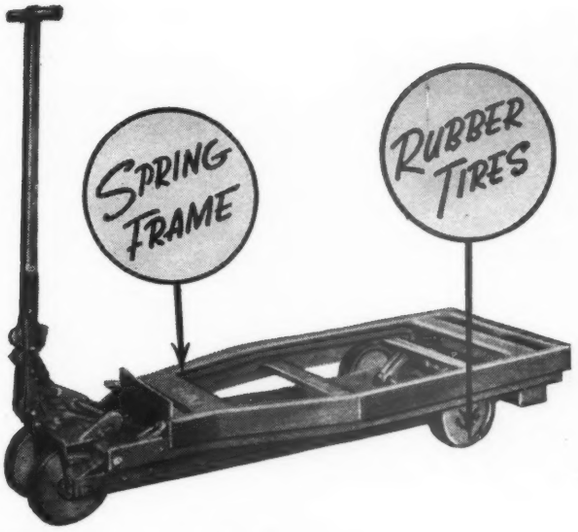

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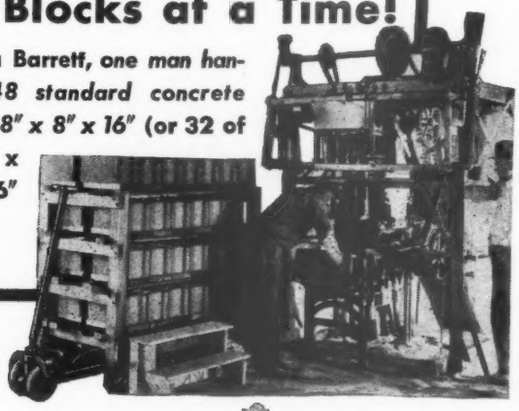

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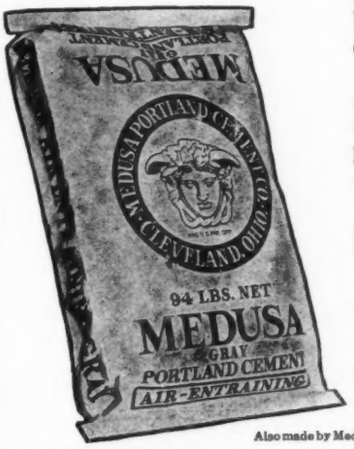

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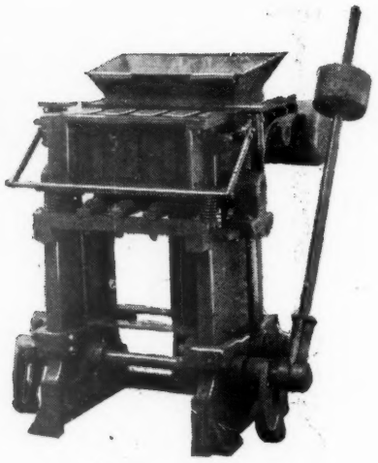

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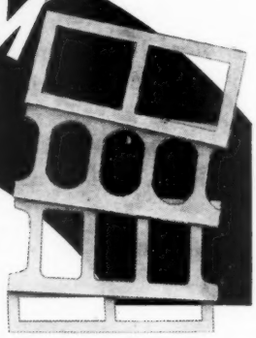

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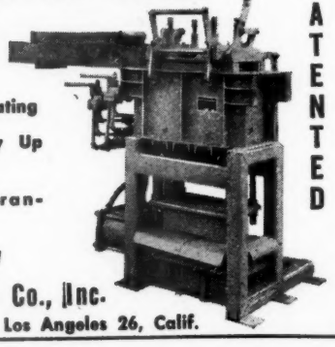

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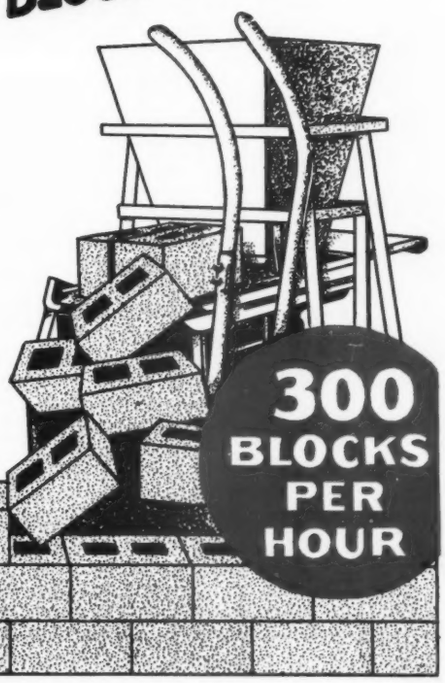

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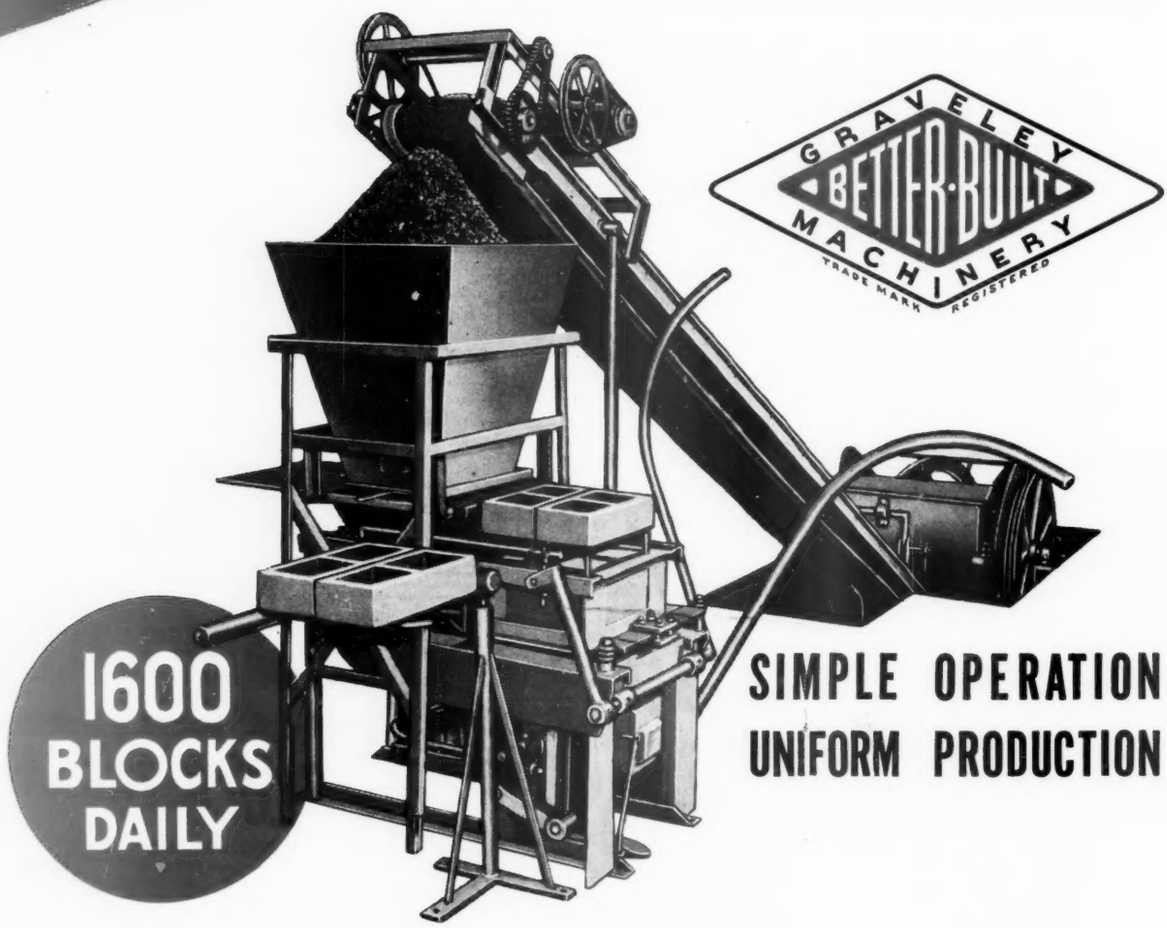

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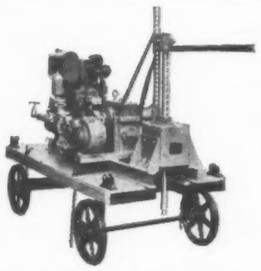

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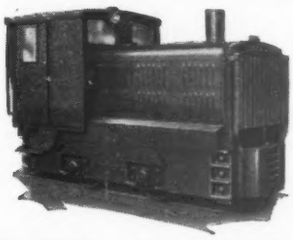

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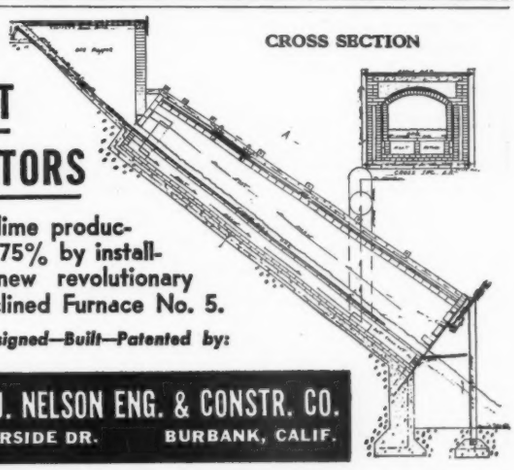

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BATCHER: Blaw Knox 55 cu. ft. capacity with 3 beam scale.

BLOWER: Ingersoll Rand 100 H.P., electric, 12000 CFM @ 1.7 lbs. pressure. NEW CONDITION.

BOILER: Erie City 150 H.P., self-contained, Economic type, ASME code, 150 lbs. pressure, complete with all fittings.

CARS: 20—All steel Atlas quarry Cars, 10 ton capacity, 2 way dump, standard gauge.

COMPRESSOR: Sullivan, two stage, angle compound, 975 ft. capacity, with 185 H.P. synchronous motor, 2200 volt, complete and guaranteed. 2—Model XCB, 1055 C.F.M., 440 volt, induction motor, short belt drive. NEW.

HOIST: Clyde 80 H.P., electric with 15 H.P. separate swinger.

DRAG SCRAPER: Sauerman 1 yd. capacity with Crescent drag scraper bucket, 60 H.P. gasoline powered, 2 speed, Hoist, all cables, blocks, etc.

GYRATORY CRUSHER: All sizes and types.

JAW CRUSHER: Traylor 36 x 42, capacity 6" material 144 tons per hour, 4" material 76 tons per hour, manganese fitted, excellent condition. Also, sizes 12 x 24 to 48 x 60.

REDUCTION CRUSHERS: Traylor 4 ft. and 2'4" type TY, with motor, V-belt drive, etc., complete.

ROLL CRUSHERS: Traylor 18 x 42.

HAMMER MILL: Dixie Mogul size 5024, hopper opening 24 x 24 with $1000.00 worth of new extra wearing parts.

VIBRATOR FEEDER: Jeffrey Traylor 6' x 6', open pan deck, powered by four No. 5 heavy M-4 motors, including motor generator equipment for 440 volt, 3 phase, 60 cycle, operation; capacity 1500 tons of earth and stone per hour, maximum size stone 3' cubes.

DRY PAN: 9 ft. with 25 H.P. motor and starter, A.C., 440 volt; excellent condition.

KILNS, COOLERS, DRYERS: 1—7'6" x 100' and 1—6'6" x 120', with or without all necessary auxiliary equipment.
1—10' x 90' Cooler or Dryer.
Also, several other sizes.

PULVERIZERS: 3—Raymond, 5 roll, low side, Mills with #11 fan cyclone separator.

MINE HOISTS: 1—150 H.P., drum 72 x 72". 1—450 H.P. drum 10' dia., 7' face. 1—600 H.P., 96" dia., 116" face. 1—120" dia. x 120" face, with 500 H.P. motor. All 3 phase, 60 cycle, 2200 volt.

LOCOMOTIVE, STEAM: 1—Lima 80 ton, 6 wheel, Switcher with tender, thoroughly modern, excellent condition. Sale or rent.

LOCOMOTIVE, GAS: 25 ton, standard gauge, air brakes, etc.

SCREENS: Robins Vibrex, double deck, 48" x 120", speed 1800 RPM, purchased new 1942, never used, new condition. Also, Robins, Link Belt, Simplicity, Nordberg, Telsmith, Traylor; all sizes.

SHOVELS: Bucyrus Erie 120-B, 5 yd. capacity, 4 yd. manganese rock dipper, Ward Leonard control equipment, 3 phase, 60 cycle, 2200 volt. 1—Bucyrus Erie 50-B Diesel Dragline, 70' boom, capacity 1½ yd. with light plant.

PUMPCRETE MACHINE: Model 190, Waukesha 40 H.P. gas motor, sub hopper, with tools, valves, fittings and 500' pipe; rebuilt.

A. J. O'NEILL
Lansdowne Theatre Building
LANSDOWNE PENNSYLVANIA
Phila. Phones: Madison 8300-8301

Cut Your Quarry Costs & Yard Haulage to Ribbons

with

Brooks Loadluggers & Dempster Dumpsters

Eliminate trucks - - Reduce labor - - Increase Production.

The average quarry without either can save MORE THAN HALF with this eqpt.

12 Model AA 2 yd. Brooks Loadlugger hoists and 65 buckets to match, at St. Paul, Minn.
4 Model "A", 1½ yd. Brooks Loadlugger hoists with buckets, Birmingham, Ala.
8 Model CH-150, 1½ yd. cap'y Brooks Loadlugger hoists and buckets, Birmingham, Ala.
4 Model CH-200, 2 yd. Brooks Loadlugger hoists, Birmingham, Ala.
10 Model 200 LF Dempster Dumpster 2 yd. hoists with buckets, Birmingham, Ala.
All buckets are new. Hoists are virtually so, and I will ship both subject to approval upon arrival and before payment at app. half price.

I ALSO HAVE IN STOCK

120 Electric Concrete vibrators, Syntron, Viber, Jackson, etc. Many of them new and all under half price.
Paving breakers; Jackhammer drills; Dr. bits and steel. Concrete mixers; Pumps, Motors; Air compressors, etc. Page dragline buckets, 1¼ to 4 yd. cap'y.

15 ton cap'y Bay City 8 wheel steam locomotive crane. Completely rebuilt by Govt. and unused since; ⅓rd of new price.

6 ft. Dia. Hvy duty clutch pulley.

2 Amphibians, or "Ducks".

— I WANT TO BUY —

60 to 70 ton Std. gauge steam locomotive; also large diesel locomotive. 6 to 8 track miles 30 to 40 lb. rails (or will exchange 70 lb. rails). Electric motors, any size or voltage.

What else do you need? I attend Govt. dealer sales of trucks, shovels, cranes, tractors and construction equipment in Atlanta, Birmingham, Jacksonville, Cincinnati, Chicago, Ft. Worth and Kansas City. I have bought machinery at auctions for twenty years. I know the game and can save you far more than my 10% commission. It will cost you nothing to tell me what you need and I *may* get it for you.

SAM SMITH, Machinery

Phone 438 **Marianna, Fla.** **P. O. Box 289**

FOR SALE **IMMEDIATE DELIVERY**

IN EXCELLENT CONDITION

LOW PRICED

12 Card Granby 79 cu. ft. ore cars 30" ga. with dump blocks and extra parts
2 Dorr Thickners complete except for tanks, 35 ft. and 40 ft. by 10 ft.
1 3 ft. by 6 ft. type K Symons Screen complete with motor and switches
1 3.3 mile interstate aerial tramway

For information & particulars

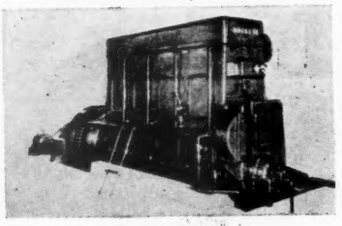
CLINCH MERCANTILE COMPANY

Box 1114 **Grass Valley, California**

BUCKEYE DIESELS

ALWAYS "TOPS" IN YOUR INDUSTRY

IMMEDIATE DELIVERY ON SEVERAL



RESULT AND GUARANTEED

SEVERAL OTHER IMPORTANT OFFERINGS

Voltage will be corrected to your requirements

700 HP	Enterprise	8 cyl.	600 KVA	2/60/2400	1938
700 HP	Superior	8 cyl.	600 KVA	2/60/2400	1938
275 HP	Alco	6 cyl.	275 KVA	3/60/440	1938
275 HP	Fairbanks	6 cyl.	275 KVA	3/60/2400	1938
350 HP	Fairbanks	6 cyl.	350 KVA	3/60/2400	1938
350 HP	G. M. Winton	6 cyl.	350 KVA	3/60/440	1937
500 HP	Buckeye	7 cyl.	375 KVA	3/60/2300	1938
225 HP	Buckeye	6 cyl.	187 KVA	3/60/440	1941
187 HP	Buckeye	6 cyl.	150 KVA	3/60/440	1937
187 HP	Buckeye	6 cyl.	187 KVA	3/60/2300	1938
150 HP	Buckeye	6 cyl.	125 KVA	3/60/440	1938
115 HP	Buckeye	6 cyl.	94 KVA	3/60/440	1938

Running inspection by Applicant.

ROBERT SCHOONMAKER

Port Washington, Long Island, N.Y.

Phone Roslyn 1220

1—20 ton Whitcomb 36" Ga. diesel Locomotive
2—20 ton Vulcan Std. Ga. gasoline Locomotives
1—35 ton Davenport Std. Ga. gasoline Mech. Locomotive
1—45 ton Plymouth diesel Mech. Std. Ga. Locomotive
1—78 ton Baldwin type 0-6-0 side tank Locomotive
1—40 ton American 8 wheel Std. Ga. diesel Locomotive Crane, 60' boom, new 1942
1—2200 cu. ft. Chi. pne. stationary air compressor, 400 HP, syn. motor 3/60/2300 V

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1601 Girard Trust Company Building
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USED MACHINERY

4—4 yard Koehring Concentric Tilting type heavy duty electric-driven MIXERS
4 & 5 Ton Goodman Battery LOCOMOTIVES 36" gauge
3 & 5 yard 36" gauge DUMP CARS
1—200 ton Nobel BATCH PLANT
1—350 ton AGGREGATE PLANT
200'-500' 24" BELT CONVEYORS complete with motors
7' x 23' x ⅞" thick Manganese TROMMEL SCREEN
48" x 22' PAN FEEDER
125' STACKER FRAME
1—1 yard overhauled Model 4 Northwest SHOVEL
1—1¼ yard Bucyrus GA-2 Combination SHOVEL & CRANE

And many other items of heavy construction equipment.

SUNDFELT EQUIPMENT COMPANY

3422 First Avenue South Seattle 4, Washington
Main 1474

¾ yd. Insley Shovel
Powered by 40 H.P. diesel unit, complete with starter.

2 yd. Diesel Dragline
Page Walker—60' boom
Powered by Model 15 diesel motor.

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"ANYTHING containing IRON or STEEL"

SELECTED ITEMS
CONSTRUCTION AND MATERIAL HANDLING EQUIPMENT IN STOCK
TESTED AND DEMONSTRATED

New 1946 Rosco Distributor, 1250 gallons, mounted on new 1946 Autocar Truck. (THIS IS STANDARD COMMERCIAL EQUIPMENT, NOT ARMY SURPLUS.)

Clark 2 Ton, Gasoline power Pallet or Platform Lift Truck —10 ft. lift.

Vaughn 1 Ton, Gasoline Power, Tilting Fork Truck.
American 8¼ x 10—Three drum Steam Hoist with Boiler and Independent Swinger.

Ing. Rand 735 Ft. Stationary two stage Compressor—150 H.P. Motor—excellent condition—reasonable price.
Two 110 ft. Gasoline powered Compressors on Ford and GMC Trucks—with tools—BARGAINS.

Sullivan 160 Ft. two stage Portable Compressor—Gas Power.
International I-30 Industrial Tractors with Pneumatic and solid R.T. Wheels.

Two 10 Ton Gas 3 wheel Road Rollers recently overhauled.

Hough Rotary Road Broom on Intl. R.T. wheel Tractor.

Dempster Dumpster Hoist attachments for 1 or 1½ ton Trucks.

Clyde 5 Ton Steel Guy Derrick, 40′ boom.

Concrete Road Finishers—10-12 feet or 20-24 feet.

Diesel Generating Plant—37.5 KVA—Rebuilt.

20 KW. Portable Gasoline Generator on pneumatic tired Trailer.

Alemite and Graco portable Grease & Lubricating outfits for Truck mounting—Rebuilt.

Sauerman ½ Yd. Gasoline Power Drag Scraper outfit—Rebuilt.

1—Jaeger 2½ Yd. High Dump, Transit Mix Body (Being Rebuilt).

1—Jaeger 2½ Yd. Horizontal, Transit Mix Body (Being Rebuilt).

2—Jaeger 4½ Yd. Transit Mix Agitators, High Dump—Engine Driven—mounted on 1941 Autocar three axle dual drive Trucks. (NOW BEING REBUILT—CAN BE CONVERTED TO 3 YD. MIXERS.)

New Jaeger single drum Hoists—1500 pds. pull—air cooled Engines.

Pioneer Ladder type Trencher 14 to 18″ width—10 ft. depth —Rebuilt.

Koehring 14-S (3 bag) Concrete Mixer—Power Loader—Vertical Tank.

Pumpcrete outfit—No. 160—Gasoline Power—300′ Pipe and accessories.

Whiteman Cement Rodding Machines—Rebuilt.

Hundreds of other items for Rental Only—Consult us for your requirements.

SERVICE SUPPLY CORPORATION
20th & Erie Ave. **Philadelphia 40, Pa.**

"30 YEARS OF SERVICE"

FOR SALE

THE DIESEL THE CONTRACTOR HAS BEEN WAITING FOR

GENERAL MOTORS DIESEL ENGINES

20—Heavy Duty Model 6-71 Twin Diesels, 12-cyl. 4¼″x5″, 200 H.P. at 1200 R.P.M., 400 H.P. at 2000 R.P.M.

20—Heavy Duty Model 6-71 Single Diesels, 6-Cyl. 4¼″x5″, 103 H.P. at 1200 R.P.M., 200 H.P. at 2000 R.P.M.

All furnished with Clutch, Elec. Starters, Governors, Radiators and Fans optional. Ideal for Shovels, Trucks, Generator Plants, Marine and Stationary installations.

CONSTRUCTION & POWER MACHINERY, INC.
270—23d St. **Brooklyn, N. Y.**
Tel. South 8-4900

EXCELLENT VALUES

30 Ton 1942 Model 30S Orton Steam Locomotive Cranes. 100′ boom.
18 Western 20 yd. rebuilt dump cars.
25 Ton Plymouth Diesel Loco. 1942.
30 Ton American steel stiffleg.
100 HP 3 drum American gas hoist.
475 HP Fairbanks, 8 cyl. Diesel 1200 rpm, with or w/o generator.
125 HP Atlas Diesel. Also gen.
25, 50 & 100 KW Diesel gen. sets.
500′ Ing. Rand Motor Driven Comp.
Haiss ¾ & 1 yd. clamshell buckets.

MISSISSIPPI VALLEY EQUIPMENT CO.
513 Locust St. **St. Louis 1, Mo.**

FOR SALE

1—Chrystie 80″x45′ Rotary Dryer.
1—Oliver 8′x10′ Rotary Vacuum Filter.
1—Tube Mill, 5′x15′.
2—Rotary Screens 2′x5′.
2—Dorr 15′ Bowl Classifiers.
2—Dorrco 4″ Diaphragm Pumps.
1—Sturtevant 36″ Rock Emery Mill.
1—Williams No. 3 "Regular" Hammer Mill.
2—Blystone 2000 lb. Horiz. Mixers.
10—Centrifugal & Rotary Pumps.

Only Partial Listing
Send for Bulletin No. L-26

STEIN EQUIPMENT COMPANY
426 Broome St. **New York 13, N. Y.**

USED MACHINERY FOR SALE

1—#1 Sturtevant Ring Roll Mill
1—#0 Sturtevant Ring Roll Mill
1—#1 Sturtevant Rotary Fine Crusher
1—9′ Dry Pan
1—6″ x 20″ Farrell Bacon Crusher
2—4′ x 5′ Hummer Screens
1—Telsmith Primary Breaker
1—Allis Chalmer Hammer Mill
1—10″ x 20″ Climax Jaw Crusher

PEERLESS LIME PRODUCTS CO., INC.
205 Investment Bldg., Pittsburgh, Pa.

FOR SALE

1—22″ wide continuous belt elevator, approx. 60 foot center to center pulleys with 21″ wide x 12″ deep x 8″ projection buckets, pulleys, idlers and frame.
1—Blaw-Knox Batcher #BD-1771—1 with Howe 3 beam scale #1337511. 1 cu. yd.
1—Telsmith Reduction Crusher—Size 32, Shop #1278 complete with 30 H.P. Tex rope drive.
1—Kennedy Van Saun 3′ x 8′ Vibrating Screen with 3 decks.
1—#19 Kennedy Gearless Gyrator Crusher #1446 equipped with flat belt drive pulley.
2—Two deck 5′ x 10″ Stephens-Adamson Vibrating Screens, Rotors Size 4—Throw ¼″.
1—Lot of repair parts for P&H Crane 700.
1—Lot of repair parts for P&H Crane 600.

Henry B. Haske, c/o The Arundel Corporation
Pier 2, Pratt Street **Baltimore 2, Maryland**

STONE CRUSHERS

15x24, 18x32, 24x36.

CONVEYORS

Belt & Drag, tailored to suit your requirements.

PUMPS

4″ and 6″, centrifugal, gas driven.
Rebuilt—very low price.

THE INDUSTRIAL EQUIPMENT CORPORATION
Established 1902
705 First National Bank Building
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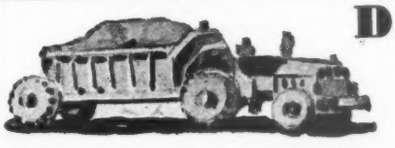
Warehouse: Carnegie, Pennsylvania



DUMP TRUCKS

194 DUMP TRUCKS from 1 yd. up to 21 yds. are available.
Phone, Write or Wire for Complete Information.

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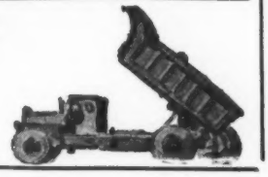

SPEAKING OF GOOD BUYS.....

Here are some of the many outstanding Consolidated Machinery Buys available for Immediate Shipment. When you call on Consolidated you are sure of getting A-1 machinery.

TRUCK CRANE

1—18 ton Truck Crane, mounted on 8-14:00x20 pneumatic tires, Model 255-A, P. & H., equipped with Waukesha Type MZB gasoline engine, 55' steel boom, hydraulic controls. Lifting capacity 18 tons. Manufactured by Harnischfeger Corp., new in 1941. USED FOUR MONTHS ON ONE JOB. With this Crane we can also include a crawler mounting with which this crane was originally furnished.

SHOVEL

1—1 yd. P. & H. Model 600-A Shovel, gasoline, fitted with new crawler treads.

GOOD USED EQUIPMENT—QUICK SHIPMENT RAYMOND PULVERIZERS

2—4 roll Raymond High Side Pulverizers, each equipped with air classifier, one of the "whizzer" type; Raymond exhauster, cyclone collector and inter-connecting piping. For products as fine as 99.9%—325 mesh, with coarser adjustments.

2—No. 0 Beater type—equipped as above—but including automatic throwout attachments and motors.

5—Nos. 3, 1, 00 and 0000—Beater types.

2—No. 70 "Imp" Coal Pulverizers; also No. 45, No. 55 and two Bowl Mills.

BRIQUETTE PRESS

1—Komarek-Greaves, two rolls, 32" dia. x 24" face, with extra shafts and rolls. Rated on coal—25 t.p.h.

CRUSHING ROLLS

1—24"x40" Penna. Crusher Co. Single Roll, also 24"x24" Jeffrey, 24x28" Mead-Morrison, 36"x60" Fairmount—all single roll.

2—36"x16" Allis-Chalmers Type "B" double roll, also 24x14", 42x16" and 54x20" A-C.

DIRECT HEAT ROTARY DRYERS

2—4'x30' American Process, ⅝" shells, excellent condition. Now at Anniston, Ala., and must be removed and shipped quickly. Priced accordingly.

1—5x30' Cummer, mounted on I-beam frame, with furnace, etc.

2—6'x30' Ruggles-Coles, ⅝" shells, for single or double shell operation.

JAW CRUSHERS

1—9"x15" Allis-Chalmers, Blake type.
1—18x36" Farrel-Bacon, Type B.
2—24x36" Traylor, Type A.
1—30x42" Farrel-Bacon, Type B.
1—22x50" Champion.
1—36x54" Buchanan.

HARDINGE CONICAL MILLS

4—6'x22", 6'x30" and two 8'x30" Pebble Mills, all silex lined, continuous.
1—5'x22" Ball Mill, iron lined.
1—6'x12' Rod Mill, straight side, iron lined.

AIR SEPARATORS

5—30", 5', 6', 8' and 14' dia.
1—14' dia. Sturtevant.
1—Model BX-100 Sutton, Steel & Steel Table.

VIBRATING SCREENS

1—Battery of two 3'x5' Tyler Hummers, Type No. 31, TRIPLE DECK, with gen. set.
1—Battery two Tylers, No. 33, single deck.
3—Tyler 4'x5', No. 37, single deck.

CONSOLIDATED PRODUCTS COMPANY, INC.
17-19 PARK ROW NEW YORK, N. Y.
Shops and Yard at Newark, N. J., cover eight acres.

CRUSHING EQUIPMENT

1—Cedarapids "2036" RB Jaw Crusher
1—Stephens—Adamson 1624 Roll Crusher
1—Stover "101A" Used Pulverizer
1—General Portable Bucket Loader. Like New
1—Eagle Portable Bucket Loader. NEW
1—21 yd. Used Bin
2—Cedarapids "1020" Used Jaw Crushers
1—Ford V-8 Truck w/ Rebuilt Baughman Spreader Box
1—Conveyor (Stationary) 24" x 65'
1—Conveyor (Stationary) 20" x 114'
1—Badger 3 x 8 Vibrating Screen. NEW
1—A-W No. 3 Gyratory Crusher

SHOVELS AND CRANES

1—Northwest "104" 1¼ yd. Dragline
1—Northwest "105" 1-yd. Dragline
1—Sargent "22" ½ yd. Dragline
1—Page "RC" NEW ½ yd. Drag Bucket
1—Link-Belt Speeder ½ yd. Drag Bucket. NEW
1—Link-Belt Speeder ¾ yd. Drag Bucket. NEW
1—Williams "12M" ½ yd. New Clam Bucket
2—Page "RM" ¾ yd. NEW Drag Buckets
1—Hendrix "TS" ¾ yd. NEW Drag Bucket
1—Hendrix "TS" 1 yd. NEW Drag Bucket
2—½ yd. Rebuilt Clam Buckets
2—Ottawa Hydraulic Front End Loaders for IHC "H" and "M" Tractors

POWER UNITS

1—Minneapolis-Moline 38 HP Power Unit. NEW
1—Minneapolis-Moline 26 HP Power Unit. NEW
1—Waukesha-Hesselman 46 HP NEW engine
1—Minneapolis-Moline 250 HP Used Power Unit

AIR EQUIPMENT

1—Sullivan "105" Port. Compressor
1—Davey "105D" Port. Compressor. NEW
1—Gardner-Denver 160 ft. Used Compressor. Pneumatics
1—Davey "210D" Compressor. NEW
1—Davey "315D" Port. Compressor. NEW
1—Cleveland "DR-30" NEW Wagon Drill
15—Wayne 2.2 cu. ft. NEW Shop Compressors
12—Cleveland Paving Breakers & Drills. NEW

MISCELLANEOUS

1—M-M "BTI" Tractor w/ Mower. NEW
1—A-C "HD14" Tractor w/ dozer. 3 Mo. old
1—Caterpillar "40" Diesel Tractor w/ dozer
1—Rex "40M" 4" Pump. NEW
1—Highway Cinder Spreader. NEW
1—Kohler 1500-Watt Lite Plant. NEW
6—Climax 2500 Watt AC Lite Plants. NEW

"We Own This Equipment"

EIGHMY EQUIPMENT COMPANY
526 W. State St., Rockford, Illinois

DIESEL POWER

45,000 Horsepower
FOR YOUR SELECTION
Modern — Immediate Delivery
COMPLETE PLANTS

1—3—4—6 Engine Generator Plants
Engine Generator Sets
1800 H.P.—1500 KVA Capacity and Smaller Sets

Fairbanks-Morse	Busch-Sulzer
Superior	McIntosh-Seymour
Atlas Imperial	General Motors
Buckeye	De La Vergne
Chicago Pneumatic	Ingersoll Rand
Washington Iron Works	Worthington

ELECTRIC BOAT

PORTABLE POWER UNITS
International-Harvester Caterpillar
Cummins Buda Superior Waukesha
Sheppard Lister Murphy Hercules

IN STOCK — READY FOR SERVICE

Shops and Warehouse, Jersey City, N. J.

Specify Your Diesel Power Requirements

A. G. SCHOONMAKER COMPANY
Diesels
50 Church St. Phone Worth 2-0455
New York 7, N. Y.
Business Established 1898

FOR SALE

THORNTON TANDEM
1941 Chevrolet
Chassis & Cab
26,000 actual miles
Below ceiling price

1 YARD McMYLER
REHANDLING BUCKET
Needs repairs — Priced Low
Make us an offer

READY MIXED CONCRETE, INC.
Second St. at Penna. RR., Mansfield, Ohio

1¼ yard Northwest Shovel & Crane, Model 104
¾ yard P. & H. Shovel & Crane, Model 206
50" x 24" Champion Jaw Crusher, #20-D
36" x 24" Farrel Jaw Crusher, Type 12-B
36" x 15" Farrel Jaw Crusher, Type 22-B
24" x 13" Farrel Jaw Crusher, Type 8½-B
28" x 14" Climax Jaw Crusher, Serial #1028
26" x 13" Champion Jaw Crusher #6
48" x 36" Gruendler Single Roll Crusher
30" x 14" Allis-Chalmers Double Roll Crusher
26" x 15" Farrell Double Roll Crusher
#5 Gates Gyratory Crusher
1'8" Traylor TY Reduction Crusher
#40 Telsmith Reduction Crusher
10-ton Austin Western Road Roller
2 yard Manganese Shovel Bucket
1½ yard Blaw Knox Material-Handling Bucket
⅝ yard Sauerman Dragline Hoist
Double Drum Novo Gasoline Hoist, 50 HP
36" x 16' Acme Trunnion Type Revolving Screen
5' x 8' Niagara Double Deck Heavy-Duty Vibrator Screen
3' x 6' Kennedy Double Deck Vibrator Screen
3' x 10' Niagara Double Deck Vibrator Screen
1000' of 1030 Drive Chain, new & second-hand
150' Heavy-Duty Manganese Chain, 6" pitch, with K-2 attachment every third link
560' #102 Chain with K-2 attachment
980' Chabelco 2115 Chain, 6" pitch, with K-2 attachment
175 Sprockets for 6", 5" and 4" pitch Chain
180' No. 825 Chain with K-2 attachment
212 Manganese Type A Buckets 8 x 5 x 5
33 Manganese Type A Buckets 10 x 6 x 5
27 Manganese Type A Buckets 12 x 7 x 6
139 Manganese Type A Buckets 16 x 8 x 7
46 Manganese Type A Buckets 18 x 9 x 8
83 Manganese Type A Buckets 20 x 9 x 8
About 3000 Steel Buckets in following sizes: 8", 10", 12", 16", 18", 24", and 26"
Any size Belt or Chain Elevator, with Gear or Speed Reducer
20 Brand new American Pulley Speed Reducers, 13 to 1 reduction
4000' Brand new Conveyor Belting, from 18" to 36" wide
76 Pillow Block Link Belt Roller Bearings for 2-11/16 Shaft & 1-15/16 Shaft
180 Self-Aligning Stephens-Adamson Ball-Bearing Pillow Blocks for 2-3/16, 2-15/16, 3-7/16 and 4-15/16 Shafts
36 Brand new Fafnir Self-Aligning Ball-Bearing Pillow Block Bearings for 1-15/16, 2-7/16 and 2-11/16 Shafts
225' x 30" Belt Conveyor, with Frame, Speed Reducer, & Belting
148' x 24" Belt Conveyor, with Frame, Speed Reducer, & Belting
61' x 24" Belt Conveyor, with Frame, Speed Reducer, & Belting
83' x 18" Belt Conveyor, with Frame, Speed Reducer, & Belting
54' x 18" Belt Conveyor, with Frame, Speed Reducer, & Belting

All the above equipment is located in our yard and can be inspected any time upon advance notice.

FRANK A. KREMSER & SONS, INC.
3435-45 North 5th Street
Philadelphia 40, Pennsylvania
Office Phone Regent 7272 Night Phone Hancock 7959

HOBART 300 AMPERE WELDERS

Model MR 300-S specification 830 A, rated 40 volts, 300 ampere driven by 20 H.P., 1750 RPM, motor 220/440/60/3. Latest type, in excellent condition. Quantity prices on request.

HEAVY INDUSTRIAL MILL EQUIPMENT

Good Condition — Ready for Loading

2—Vulcan Rotary Dryers 6′x64′

1—Vulcan Cooler 7′x80′ new

1—1″x8″ Fuller-Kinyon Pump, Type H, Cat F-K, 2A

2—Allis-Chalmers Tube Mills 7′x22′ reconditioned

1—Smidth Tube Mill 5′6″x22′

1—Allis-Chalmers Tube Mill 6′x22′ reconditioned

1—No. 8745 Allis-Chalmers 8′x45′ Compeb, 4 compartment mill

SPECIALS

20 ton G.E. Electric Locomotive, 500 volt DC

5000 KW Westinghouse Turbo-Generator, 3600 RPM, 200# pressure, condensing, 2300/60/3, complete

800 KW Westinghouse M-G set, syn. motor 1150 HP, 514 RPM, 13200/60/3. Generator 250 V. DC with direct connected exciter, complete with starter and panel boards

MISCELLANEOUS

7 Rotary kilns Vulcan & Mosser 5′ to 8′ dia. x 60 to 125′ long

No. 3 Williams Hammer Mill, 6 rows of hammers, 8/row

30x24 Jeffery Type Swing Hammer Pulverizer

Dings Magnetic Separator IR14, 110 Volt, 86 RPM, complete with M-G set

3600 sq. ft. Wheeler Surface Condenser

2—50 HP Jones Herringbone Speed Reducers, ratio 93.5:1

2—Mosser 5′6″x5′x52′6″ Dryers

1—Mosser 6′x5′x55′ Dryer

1—Schutz O'Neill 18″ Pulverizer

1—Schutz O'Neill 20″ Pulverizer

1—Kent 26″ Pulverizer

1—Raymond Pulverizer 5-0

700 HP G.E. Type KF motor, 2300/60/3, 1800 RPM

50 KW Westinghouse M-G set, 1200 RPM, 125 V. DC, 75 HP motor, 2200/60/3

1—Ruggles Coles A-8 Double Shell Dryer

75 HP Westinghouse Turbo-Gen. 200# pres. 7200 RPM geared to 50 KW 125V DC 1200 RPM Generator

1000 HP G.E. 600 RPM 6600/60/3 Slip Ring motor with controls

2—Raymond Pulverizers 4-0

1—Raymond Pulverizer 3-0

3—Worthington 6x4x6 Duplex Steam Pumps

Also pumps — compressors — tanks — motors — boilers — power plants

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Large deposit of high grade chemical limestone in the Bellefonte, Pa., ledge. Right of way for siding connecting with Pennsylvania Railroad. Deposit has been opened by quarry. Natural drainage. Advertised stone can be quarried or mined by drift or shaft. Depth of strata unknown. Bellefonte ledge in this area now being mined to a depth of 800 feet. This stone analyzes less than 1% silica. For complete details write:

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SAND PUMP, 8", "Erie" with Pulley.

MIXER, "Ransome" 56-S, with 40 h.p., 440 V., 3 Ph. motor.

PAVING MIXER, "Ransome," 34-E, Dual drum, Cummins Diesel engine.

GRADER, "Adams" 412, tandem, with International Diesel engine.

ROLLER, "Huber," 3 wheel, 10 ton, gas.

DUMP BODY, "Gar Wood," with hoist.

GREASING UNIT, "Alemite," with 4 tanks, 4 reels & hose including Air compressor.

BOOM SECTIONS — 70'-0" boom sections for #6 Northwest Crane in 10 & 20 ft. sections.

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One Telsmith 24" Revolving sand and gravel screen and washer.

One Multiplex hand operated Concrete Block Machine with 200 pallets. Makes 4"x8"x16" blocks.

One No. 3 Pioneer Single deck shaker screen—1½" openings.

One Cedar Rapids 2'x6' vibrating screen, double deck, 1" openings on top and ¼" openings on bottom. One Hercules Model X gasoline engine with Twin disc Clutch.

One 14 cu. ft. Ideal concrete mixer for concrete block plant complete with drives, but no power.

One 60 cu. ft. Model F. Portland concrete mixer for concrete block plant complete with all drives but no power unit.

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One Cedar Rapids portable crushing and screening plant.

15 batcher boxes with cars and 500 to 1000 ft. of track. Ideal for quarry use.

One Northwest Model 105 combination crane and dragline with 45 to 60 ft. boom. In good condition ready to operate.

One 6" Morris Centrifugal Sand and Gravel Pump in good condition.

Above equipment available immediately but subject to prior sale.

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Caterpillar D7 complete with T7 Traxcavator including two yard bucket, 1942 model, fair condition, F.O.B. Louisville $5735

•

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BRAND NEW MACK 10-ton Diesel Trucks, 10-wheel, 11.00x24 tires, 6x4 drive, 173" wheelbase, Mack Model ED 6-cyl. Diesel Engine. Can be furnished with 15-18 Yd. Rear Dump Rock Bodies or present Cargo type bodies.

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1—300 HP Gen. Motors, 480 V. 60 cy. gen.
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3—150 KVA G. E. 33000—2300 V.
3—100 KVA G. E. 33000—2300 V.
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HP	Make	Type	Volts	Speed
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500	Gen. Elec.	1-P	440	450
300	Gen. Elec.	1-M	2200	514
250	GE	IP	440	450
150	GE	M-547	2200	1170
100	Westinghouse	vert	2200	1160
100	Ideal	AV	2200/440	720
100	Westinghouse	HF	440	230
75	GE	I-M	440	860
75	Al. Ch.		440	690
60	GE	IM	440	862
50	Al. Ch.		440	690
50	Wtg.		220	860
40	Cr. Wh.	20Q	220	1160
35	Wtg.	CW	440	1200

TRANSFORMERS

KVA	Make	Type	Volts
1000	AC		13200/480
100	Wtg.	SK	2300/110/220
75	Westinghouse	S	3810/122/244
75	Wtg.	S	3810/244/122
6	Sorgel	SO air	140/220
5	GE	H	1100/2200/220/440
5	Pitts.		440/110/220

Also NEW units all sizes and volts.

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10 to 20 ton capacity per hour.....$345
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Austin Western 88 Motor Patrol.
Elgin street sweeper.....Concrete mixers

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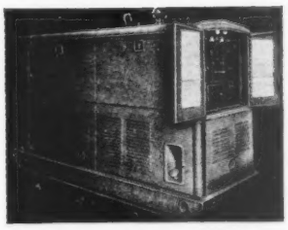

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60 HP Fairbanks Morse.
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5 Roll High Side.

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Model 150-B, Price $325

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IMMEDIATE DELIVERY

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Allis Chalmers Type "R" all steel reduction crusher with Texrope drive and 30 H. P. motor. Completely rebuilt Nov. '45. Reason for selling, we are installing larger crusher.

Reference—Mr. Goldberg, Crusher Dept. Allis-Chalmers Milwaukee, Wis.

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Jaw Crushers—4"x8" up to 18"x36".
Crushing Rolls—16"x10" up to 54"x24".
Gyratory Crushers—No. 3, No. 12.
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Lime hydrating plant.
New Dryers built for all purposes.

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Diamond Model 36 Gravel Crushing and Screening Plant in fine condition—complete with extra parts.

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1—3 ton per hour Kuntz Hydrator
1—5 ton per hour Kuntz Hydrator
Each replaced for larger sizes. These are rebuilt and 100% efficient—80% new.
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We have a number of lime feeders and a number of hydrate feeders.
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M. WENZEL
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Complete Good Roads Portable Crushing plant 14 x 40".
22 x 50" Champion, 14 x 36" Cedar Rapids, Austin No. 440, 24 x 36" Traylor, 18 x 36" Universal, roller bearing Jaw Crushers.
4½' x 3' Traylor "Krupp" type Ball Mill.
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30 ton std. Ga. Diesel Locomotive.
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Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

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I.D. Size	Length	per Length
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1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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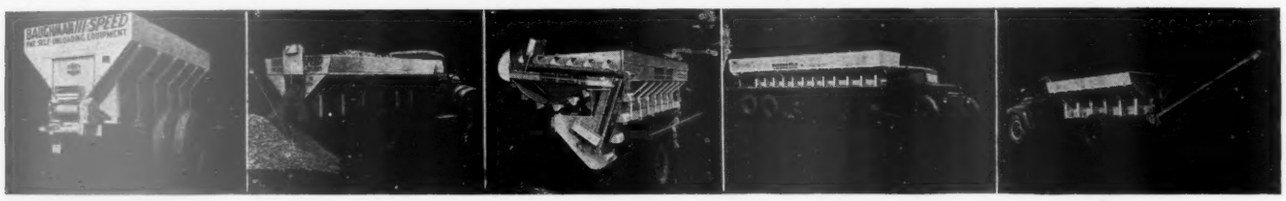

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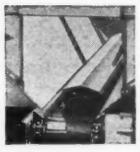
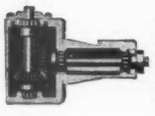
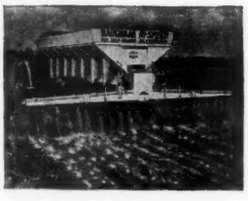


Cut-away view of our steel drag-chain with belt attached. Also note new type, adjustable, feed-choker.



View of our Distributor Case. Heavy, hardened and annealed cut steel gears.

View of our heavy cut steel and bronze, 15 to 1, Gear Reduction. Simple, efficient, trouble-free. Will give years of service.



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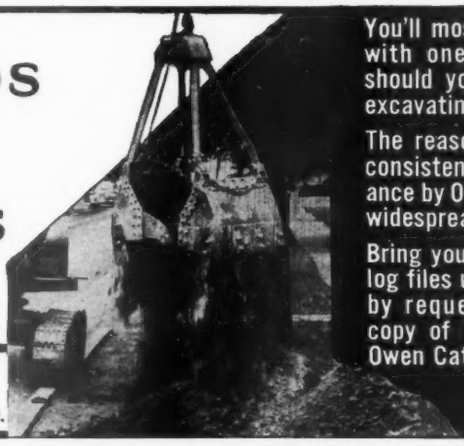

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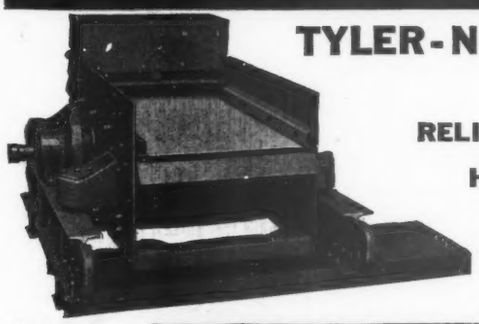

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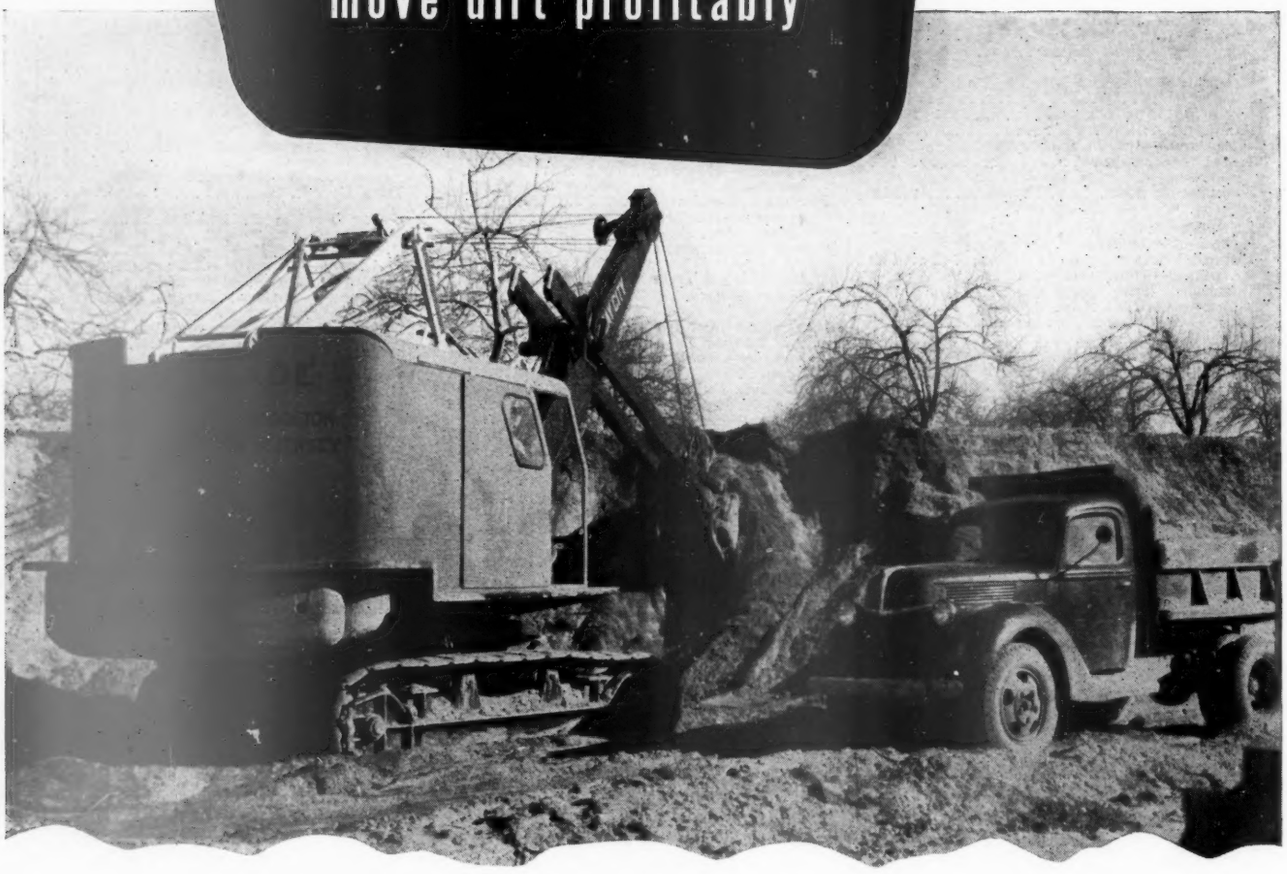

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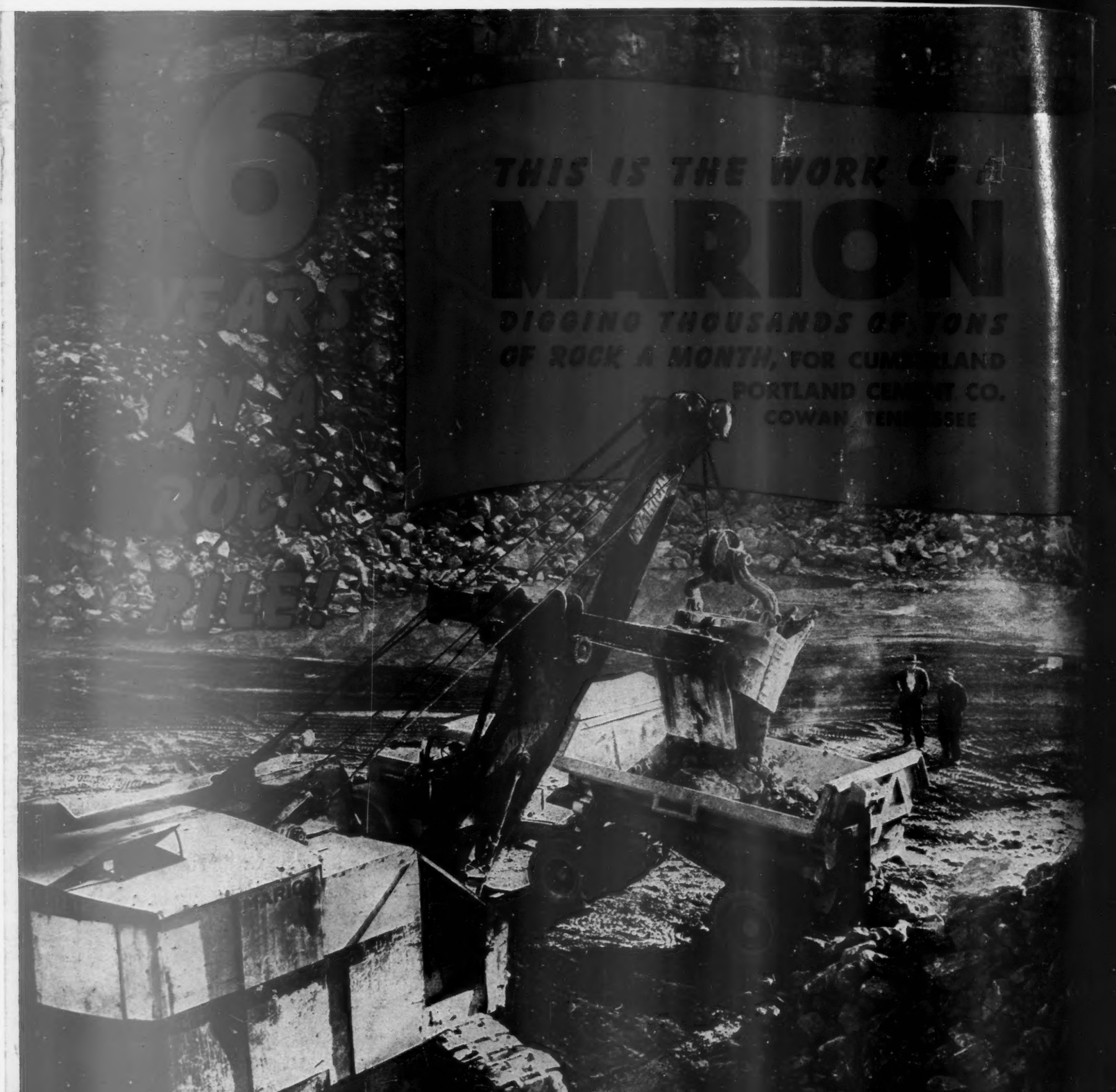

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